

PURPOSE of the ARCADIAN is to disseminate material having to do with the Bally/AstroVision Arcade game/computer. The underlying reason for the paper is to help all understand how and why the machine operates the way it does. We can then make it operate the way we want it to, and we can expand its usefulness..

A HISTORY STATEMENT is getting to be a tradition - a few words for those who start their subscription with Volume III: When the Chicago mail order house of JS&A advertised the Bally in the popular magazines in Sept 1977, a number of us bought into it. Lots of promises, but delivery was poor, both on the existing hardware and on the promised stuff. Some never did come. The Tiny Basic cartridge did show up about a year later, and I started this paper in November, 1978. I got tired of waiting for the Add-On and was about to contract for a slightly smaller unit when the Fidelity deal made us take a second look. There was no point in trying to compete with the factory, and that is still a consideration. Instead, we started to concentrate on small Projects (more later). AstroVision took over the consumer products div. of Bally in August 1980, and we are now looking to them for continued support.

USER GROUP REPORTS are needed - partly to get others in the area to attend, and partly for our mutual knowledge. You don't have to submit as polished an item as George Moses did - printing is his business. - we just need something that is informative and legible, as:

Chicago Bally User Group      meets 3rd Sunday every month at  
DeVry Technical Institute      3300 N. Campbell      Chicago, IL  
contact: Mike Maslowski      312-654-8937

SHORT PERSONAL NOTE of thanks to those who sent well wishes on our 25th. We enjoyed a four-week sojourn to Europe, where we spent three really beautiful weeks in Switzerland. One of my other hobby interests is model railroading, and the Swiss have a well-ordered system that operates with precision and the trip was quite informative to me. We also made 6 lake voyages by boat, and climbed the Susten Pass by postal bus to see the Alps up close.

FORMAT of this paper is rather loose, but I try to include material for both the tyro and the expert. Material in the ARCADIAN is subscriber generated, so I am looking to you for our continued operation and therefore mutual learning. I need programs and tutorials, and at all levels. Programs should be sent as a tape, and a listing as well would help for those times when a garble comes through. The programs in the ARCADIAN are listed directly from the Bally to a COMPRINT 912S printer. There is a little idiosyncrasy in that combination - the printer has no divide sign (neither does my typewriter), and it can't tell the difference between a multiply sign or a lower case X, and there is no right arrow, either. So, whenever you see a lower case letter, it means:

a = right arrow( > )  
b = multiply ( x )  
c = divide ( ÷ )

ASTROVISION TAKEOVER The new manufacturer of the Arcade is AstroVision, Inc., a Columbus, Ohio firm. The actual production will probably be done at their subsidiary, E.F. Johnson, the CB manufacturer. Latest words on plans, etc., are in George Moses' report, following...

MICHIGAN USER GROUP report by George Moses. These two pages of material were just received, and there is plenty of up-to-the-minute information therein.

A. When the Arcade was designed it was the most advanced in the field, and with its three custom chips and Z-80 microprocessor it still has the fastest graphics of any machine on the market at less than twice the price! (The music processor and 3-voice sound chip compares favorably with some sound synthesizers costing up to \$2500 say the development engineers.) But Astrovision doesn't intend to sit on this design forever. Already a complete redesign is in the planning stages to offer a new "state of the art" Bally Arcade, possibly late next year that will be as far ahead of the old as it was when first introduced in 1978.

Q. We're still doing a lot of work about the Arcade's Bally Basic? Why didn't Bally give us more information about it? A. We don't know why Bally held such a close-to-the-vest attitude about the insides of the Bally Basic, certainly the most fascinating cartridge they've ever produced. But we are trying to put together a master file of Bally users, whether through warranty registrations, lists supplied to us from users groups that contact us or through Cursor and Arcadian newsletters, certainly the two main sources of programs for the Bally Basic. We want to bring the Bally users together and help them to develop better software. And, we are going to be looking for other sources of software to supplement Bally in developing and marketing programs for the Arcade. We also plan to market six to eight new game cartridges between now and next July. We've been working on them with us today to demonstrate. Dogpatch, which is only the first of a series of Grand Prix and Demolition Derby, which still needs a little development to make it more challenging, and the music cartridge that we hope to have ready very soon.

After demonstrating the cartridges the air was abuzz with users playing the new games and showing off their own software to Charles and Claghorn. Bob Weber showed off his Blue Ram and loaded the Bally-Pinball game into his Arcade off a cassette tape thru the Blue Ram. Dave Ibach and Steve Walters demonstrated their foreground-background processing routine formatted into a spooky Halloween demo that flying around on a broom in front of a haunted house. The witch is updated over 15,000 times a second, faster than the TV scans the picture tube, so she doesn't blink at all! Also, Steve Wilson had a new color basic cartridge and a machine monitor cartridge which shows him a program the Z-80 directly in hex. Also he brought his own K&K computer addition he built from trashbin computer parts. It works!

We were very impressed with Ken Charles and Rick Claghorn from AstroVision, and we hope they were impressed with our group of tenacious Bally lovers. Hope springs eternal in the heart of man, and if there is new life for the Bally Arcade there are many of us who would love to help with suggestions, programs and criticism to make it better. If you have any, please contact AstroVision at 6460 Busch Blvd., Suite 215, Columbus, Ohio 43229, Phone (614) 885-0130.

FENTON, MICHIGAN — Two Astrovision representatives attended the meeting of the Michigan Bally Users' Group on Sunday, October 26 at Tri-County Electronics in Fenton. Ken Charles, software manager and Rick Claghorn, computer specialist arrived at noon after a five hour drive from their head quarters in Columbus, Ohio, and were immediately welcomed and assigned with questions. But first things first. They dined and talked food and beverage table and were brought back to life before the final meeting began.

If Ken Charles and Rick Claghorn are the future of Astrovision's dedication to the Arcade and its users than the future of this product and its future software and peripherals looks bright once again. It does take dedication to give up a Sunday with the family, spend 10 hours driving (round trip) and to occupy yourself all afternoon talking about products you've looked at all week at work!

The real meeting began. Ken Charles and Rick Claghorn were introduced and Charles took the floor. His remarks began with a short history of Astrovision and their previous entry into the video game market with Cybervision, a game, much like Bally's that was ahead of its time and not very aggressively marketed. Its chief retail outlet was Montgomery Ward's who, as they are now doing with the Bally, only showed them in stock before Christmas and then only in the sporting goods department next to the jockstraps.

Now Charles said they are going to aggressively market the Arcade in a great many ways. He said that the computer enthusiast such as our meeting place, Tri County Electronics who stocks Arcades, cartridges, control handles and interfaces all year round! Also, Ron Pollock, the owner, advertised our meeting to the public in the local papers, spending hundreds of dollars to generate interest in the Bally. He really made us feel welcome! The questions began:

Q. When will the much-promised "add-under" keyboard memory be offered?

A. Hopefully by the middle of 1981 or sooner. There were many versions developed by Bally, none of which was what the buyer really seemed to want according to their surveys. They're trying to develop this as a 16K add-on with a language based on Tense or Fortran in a basic format that will allow the user to program superb graphics for games.

Q. What type of peripherals are ports for attaching peripherals such as light pens, tape decks and printers? Astrovision does not plan to promote the Arcade as a word processing machine. Any attachments offered will be to enhance its game playing capabilities, a property the Arcade has over all of its competition in the video field at anywhere near its price range.

Q. Now that there is advanced competition in the video game field that didn't exist when the Arcade was introduced how does Astrovision intend to capture a share of the market with a product designed 5 years ago?

BLUE RAM TUTORIALS will again appear in the next issue. I wanted to get the interesting news from the Michigan User Group out to all, so I have deferred some material to next month.



Rick Claghorn, Astrovision Computer Specialist and Ron Pollock, owner of Tri-County Electronics, Fenton, Michigan talk over the manufacturer-dealer relationships.



Ken Charles, Astrovision Software Manager inspects the software of Bob Weber of W&W Software, the most prolific vendor of software for the Bally Arcade.



Dave Ibach and Brett Bilbrey discuss their fantastic breakthrough in using the foreground-background processor for smooth, fast graphics. Brett is making Dave for telling him where to stick his stack pointer.



Brett Bilbrey and Ken Charles of Astrovision looking at a display of the new Demolition Derby cartridge, still under development.

BLUE RAM KEYBOARD OPTION. To clarify my announcement of last month - Should you desire a wired and tested unit, ready to plug into the Blue Ram, send me 89.95. Should you want a kit of the electronic parts, send \$24.95 to me, and order the keyboard itself from JAMECO. You could use another keyboard that you have lying around, which is why we offer it this way, but we know it will work with the JAMECO.

## TUTORIAL MULTI-PROCESSING SYSTEMS

**Definition.** A multi-processing system consists of any computer system which utilizes two or more processors, such as the Bally and the TRS-80, both using the Z80; or the new Microsoft Z80 that fits into the Apple (6502), with two different processors.

**Discussion.** Project Three will be an interface which allows coupling the Bally system buss to the TRS-80 system buss with buffers, and signals generated to be compatible with the TRS-80 expansion module. By utilizing a 4K RAM block and appropriate WAIT lines, each Z80 CPU can put and take data in an intermediate location, thus allowing maximum speed and minimum programming.

**Application.** By using the correct software, we may use the TRS-80 keyboard to produce desired signals for the Bally to read, i.e., an intelligent keyboard. We may also display the Bally memory on the TRS-80 monitor. This requires that machine language be loaded into the Bally, to allow it to read the external RAM and write to it. By using the TRS-80's extensive trig routines in Level II Basic, we can plot multi-color graphics on the Bally display with complex formulae. If machine language routines are used, then screen memory is not needed and so four colors may be displayed, and POKED for high speed display animation. By using the Bally's A to D conversion system, the TRS-80 may run game programs which require 'paddle' input. The TRS can read data from the Bally to send to a parallel printer. The disc capability of the TRS expansion unit may be utilized. And more... All of the above are practical, but the system has yet to be tested. Comments, ideas, help, etc., are solicited, and a stamped envelope would be appreciated. Contact Rich Tietjens, 1008 Trinity, #B, Seaside, CA 93955

**FILE SEARCH** It is possible to have the Bally look for a specific program on tape and load only that program when it gets to it. Programs of any kind on a tape or disc are usually called "files" in big machine-talk, and are either titled or numbered. On the Apple, for example, you can call a file "george" and ask the computer to "RUN GEORGE" from disc, and it will search for george, load it, and then run it. On the Tektronics, it would be numbered, and you'd enter "FIND 6/LOAD/RUN" to do the same thing. Well, in studying the Tiny Basic listing, Al Rathmell found that the Arcade will do the same thing. His report follows:

"To make use of the file finding capability of Basic, a file number must be written on tape when the file is created. The number is a 16 bit (two 8-bit bytes) integer, and can have any value from -32768 to + 32767, but for simplicity, if the high order byte (the first one) is always zero, then file numbers from 0 to 255 can be written in the low order byte. The two file number bytes are written in the proper format using the TV instruction. For example, to write a program on tape as file number 10, use the following command:

```
:PRINT;TV=0;TV=10;LIST
```

The first TV instruction writes the high order byte (zero), and the second TV instruction writes the low order byte (ten). To read file number 10 into the Bally, use the following command:

```
:INPUT 10
```

The file finding system also works with the :LIST and :RUN commands. Using the file numbering capability of Bally Basic adds a professional touch to tape file management!"

ADS on the back page are free. Please make them legible. In providing this service I am also providing no guarantees and take no responsibility at all. Half-page and up ads are not free, contact me for data.

## PROGRAM REVIEW

\*\*\*\*\*

PROGRAM NAME: Tic-Tac-Tollah TYPE: GAME  
 DESCRIPTION: The Ayatollah adds a new dimension to tic-tac-toe: cheating! His eyes and mouth move as he constantly changes his mind, changes his moves, and changes the rules! Can you beat him by playing fair? Can you exercise diplomatic restraint? A really unique and creative addition to the old game.

SOURCE Name: Anderson Research and Design  
 Address: 1611 Lacota Lane  
 City: Burnsville State: MN ZIP: 55337

PROGRAM PRICE: \$ 4.95 LISTING PRICE: Not Available

RATING % based on applicable rating items. 62 / 72 = 86.1%  
 PD= 6 PP= 8 USF= 6 LC= 9 OC= 8 LI= 7 EV= XX EU= 9 OV= 7  
 Time to play 3 min. For ages 8 up # of players 1

\*\*\*\*\*

PROGRAM NAME: GRAPHICS DEMO TYPE: Tutorial  
 DESCRIPTION: Practical applications of principles described in the CURSOR Tutorial -- DIA Graphics-- by C. J. Anderson (April 88). Contains XY to Pixel Location; Poke to Pixel Chart; Screen Locator; Decimal to Poke; Type Sample and Explorer I Demo. This is mainly for people who want to explore the BALLY's graphics capabilities.

SOURCE Name: Anderson Research and Design  
 Address: 1611 Lacota Lane  
 City: Burnsville State: MN ZIP: 55337

PROGRAM PRICE: \$ LISTING PRICE: Not Available

RATING % based on applicable rating items. 51 / 63 = 80.9%  
 PD= 5 PP= 7 USF= XX LC= XX OC= 8 LI= 8 EV= 8 EU= 7 OV= 8  
 Time to play NA For Ages 18 up # of players NA

\*\*\*\*\*

PROGRAM NAME: Checkbook TYPE: Personal  
 DESCRIPTION: A program designed to be used by any member of the family to balance their personal checking account. The program explains itself as it goes along.

SOURCE Name: Anderson Research and Design  
 Address: 1611 Lacota Lane  
 City: Burnsville State: MN ZIP: 55337

PROGRAM PRICE: \$ LISTING PRICE: Not Available

RATING % based on applicable rating items. 38 / 54 = 70.3%  
 PD= 7 PP= 7 USF= XX LC= XX OC= 7 LI= 7 EV= XX EU= 9 OV= 3  
 Time to play NA For ages 18 up # of players 1

\*\*\*\*\*

PROGRAM NAME: Video Rally TYPE: GAME  
 DESCRIPTION: This is the most intriguing game program that I have found for the BALLY. If you have ever done any TSD (Time Speed & Distance) Rally's you should buy this and you will spend hours trying to get the lowest score. This is a great training aid in preparing for an actual TSD rally. The instructions for this program are excellent (8 pages). This doesn't make the playing of this game easy, however.

SOURCE Name: Anderson Research and Design  
 Address: 1611 Lacota Lane  
 City: Burnsville State: MN ZIP: 55337

PROGRAM PRICE: \$ LISTING PRICE: Not Available

RATING % based on applicable rating items. 78 / 72 = 97.2%  
 PD= 9 PP= 9 USF= 9 LC= 9 OC= 9 LI= 9 EV= XX EU= 9 OV= 7  
 Time to play 15 min. For ages 14 up # of players 1

\*\*\*\*\*

# ARCADIAN

```

1 .
2 .
3 .
4 .
5 .SPEED 0 MATH
6 .BY BOB WISEMAN
10 :RETURN :CLEAR :BC=65:FC=197
20 PRINT "ENTER +,-,c,OR b
30 Q=KP:S=0
40 CLEAR :FOR N=1TO 10:T=0;R=63
50 GOSUB 100;GOSUB 400
60 CX=-35;CY=35;S=S+T
70 PRINT "SCORE=",$4,S
75 NEXT N
80 GOTO 20
100 X=RND (9);Y=RND (9)
105 IF Q=43Z=X+Y;GOTO 200
110 IF Q=98Z=XbY;GOTO 200
115 IF Q=45W=X+Y
120 IF Q=99W=XbY
125 Z=X;X=W
200 A=20180;B=A;C=300;E=2
210 D=-43;GOSUB C
215 D=53;GOSUB C
220 D=19521;GOSUB C
225 D=20190;GOSUB C
230 D=-13871;GOSUB C
231 IF R=63L=X;M=Y;O=Z
232 IF R=63X=L;Y=M;Z=O
233 E=1;D=32;GOSUB C
235 E=1;IF X>9D=48+Xc10;X=RM;GOSUB C
240 D=48+X;GOSUB C
245 D=32;GOSUB C
250 D=Q;GOSUB C
255 D=32;GOSUB C
260 D=R;GOSUB C
265 D=32;GOSUB C
270 D=61;GOSUB C
280 IF Z>9D=48+Zc10;Z=RM;GOSUB C
285 D=48+Z;GOSUB C
286 IF L<10IF O<10D=32;GOSUB C
290 D=0;GOSUB C;CALLB;RETURN
300 X(A)=D;A=A+E;RETURN
400 I=&(23);J=&(22);K=&(21);T=T+1
410 IF I+J+K=0GOTO 400
411 R=0;X=0
415 W=I;GOSUB 430
420 W=J;GOSUB 430
425 W=K;GOSUB 430;GOTO 450
430 IF W=8X=1
435 IF W=4X=4
440 IF W=2X=7

```

Bob Wiseman  
118 St. Andrews Dr.  
Cincinnati, OH 45245

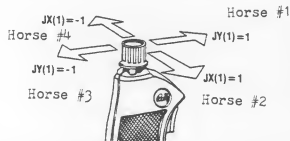
```

445 IF W X=X+R
450 R=R+1;RETURN
460 R=Y+48;U=X;GOSUB 200;NT=0;&(16)=75;&(22)=-1
465 IF M=UGOTO 500
470 T=T+300;FOR I=55TO 255STEP 5
475 &(18)=I;&(17)=Ic2;NEXT I
480 GOTO 580
500 FOR I=200TO 1STEP -5
505 &(18)=I;&(17)=Ic2;NEXT I
580 T=200-T;NT=2;&(17)=0;&(18)=0
595 RETURN

```

This Math drill program uses the giant letter routine.

Instructions, etc., for HORSE RACE, on p. 7:



Each player uses his hand controller to choose the horse he wants to bet upon and the size of his bet. To choose the horse, first move the knob to one of the four positions (see diagram) and then pull trigger. To place a bet, move the knob forward to increase the amount by \$5, move it back to decrease by \$5. Set the bet with the trigger.

BSR X-10 CONTROL can now be placed under Bally control. Our latest device will operate the BSR transmitter box (if it is the type that accepts 'remote control') through the Elue Ram. Fully assembled with documentation and a demo program, it operates wireless up to 15' from the BSR box. The price is \$19.95.

# ARCADIAN

```

1 . HORSE RACE
2 .BY HOWARD BRECHEISEN
3 CLEAR ;BC=179;INPUT "# OF PLAYERS?"H
4 CLEAR ;A=500;FOR I=1TO H;@(I)=A
5 NEXT I
9 CLEAR ;BC=18;FC=14
10 NT=0;@(9)=175
11 LINE -12,-44,4;LINE -12,43,1
12 CX=-76;CY=30
13 PRINT "HORSE ODDS
14 Z=10;FOR I=1TO 4
15 CY=Z;@(I+8)=RND (5)+1;@(I+12)=0
16 PRINT "*",#2,I,#5,@(I+8),"1"
17 Z=Z-15;NEXT I
18 CX=-6;CY=30
19 PRINT "PL POT BET HR
20 CX=-6;CY=20;PRINT "*"
21 Z=10
22 FOR I=1TO H
23 CX=-5;CY=Z
24 PRINT #1,I,#5,@(I)
25 Z=Z-15;NEXT I
27 GOSUB 252
35 NT=3;Z=10
36 FOR I=1TO H
37 CY=Z;CX=68;PRINT #1,@(I+12)
38 IF TR(I)GOTO 44
39 IF JY(I)=10(I+12)=1
40 IF JX(I)=10(I+12)=2
41 IF JY(I)=-10(I+12)=3
42 IF JX(I)=-10(I+12)=4
43 GOTO 37
44 Z=Z-15;NEXT I
50 B=0;Z=10
51 FOR I=1TO H
52 CY=Z;CX=42;PRINT #1,B
53 IF TR(I)GOTO 57
54 IF JY(I)=1B=B+5;GOTO 52
55 IF JY(I)=-1B=B-5;GOTO 52
56 GOTO 52
57 @(I+4)=B;B=0;@(I)=@(I)-(I+4)
58 Z=Z-15;NEXT I
59 GOSUB 252
60 CLEAR
71 @(9)=42
72 BC=89;FC=6
73 BOX 0,0,158,72,3;BOX 0,0,155,70,3
74 LINE 60,34,4;LINE 60,-35,3
75 LINE 59,-17,4;LINE -77,-17,3
76 LINE -77,1,4;LINE 59,1,3;LINE 59,18,4;LINE -77,18,3
77 NT=0;CX=40;CY=40
78 PRINT "FINISH
79 NT=3
107 Z=25;D=-50;E=-50;F=-50;G=-50;J=1;K=2;L=4
108 FOR I=1TO 4
109 CX=-70;CY=Z
110 PRINT "*",#1,I;GOSUB 490+I
112 Z=Z-17;NEXT I

```

```

500 BOX X,Y,6,4,J
501 LINE X+5,Y+3,L
502 BOX X+6,Y+4,3,2,J
503 BOX X+6,Y+4,1,1,K
504 LINE X-6,Y-4,J
505 LINE X-7,Y+1,L
506 LINE X-4,Y+1,J
507 LINE X+5,Y-4,J;RETURN

```

```

$ $ *
113 IF D>53IF D>EIF D>FIF D>G P=1;Q=0(9);GOTO 150
114 IF E>53IF E>DIF E>FIF E>G P=2;Q=0(10);GOTO 151
115 IF F>53IF F>DIF F>G P=3;Q=0(11);GOTO 152
116 IF G>53IF G>DIF G>E P=4;Q=0(12);GOTO 153
118 J=2
119 FOR I=1TO 4
120 GOSUB 490+I
122 NEXT I

```

Howard Brecheisen  
1017 Macklyn Lane  
Bartlesville, OK 74003

```

130 J=1
131 D=D+RND (14)+(6-0(9))
132 E=E+RND (14)+(6-0(10))
133 F=F+RND (14)+(6-0(11))
134 G=G+RND (14)+(6-0(12))
135 Z=25;GOTO 108
150 CX=-20;CY=25;PRINT "WINNER";GOTO 150
151 CX=-20;CY=9;PRINT "WINNER";GOTO 150
152 CX=-20;CY=-10;PRINT "WINNER";GOTO 150
153 CX=-20;CY=-29;PRINT "WINNER";GOTO 150
160 IF 0(13)=PGOSUB 201
161 IF 0(14)=PGOSUB 202
162 IF 0(15)=PGOSUB 203
163 IF 0(16)=PGOSUB 204
164 NT=3;GOSUB 252
165 GOTO 9
201 0(1)=0(1)+0(5)+0(5)bQ;RETURN
202 0(2)=0(2)+0(6)+0(6)bQ;RETURN
203 0(3)=0(3)+0(7)+0(7)bQ;RETURN
204 0(4)=0(4)+0(8)+0(8)bQ;RETURN

```

```

252 FOR A=1TO 1000;NEXT A
253 RETURN
491 X=D;Y=25;GOTO 500
492 X=E;Y=9;GOTO 500
493 X=F;Y=-10;GOTO 500
494 X=G;Y=-29;GOTO 500

```

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## ADS

- o FOR SALE Bally Arcade with Basic, Interface, 2 controllers, CLOWNS/BRICK-YARD, PANZER, BASEBALL, 280 ZZAP, MATH. Coaxial or regular output, loads of documentation including all Arcadian newsletters. Works fine, seldom used. \$175, Jay Hess, 52 Eaglehaven Ct. San Jose, CA 95111. 408-227-8477
- o FOR SALE Complete Bally Arcade, includes 4 hand controls, BASIC, Interface, BASEBALL, CLOWNS, SEA WOLF, Manuals, Also line filter and custom carrying case. \$300 or offer. Mark Stradinger, 331 Grove St. Fort Atkinson, WI 53538 414-563-3452
- o SUPER SOFTWARE by Rob Rosenhouse has expanded its line of software into 5 cassettes which include 2 programs each. Listings also available. Free RND (ART) program and descriptions for SAE, to Rob Rosenhouse, 44 Forestbrook Dr., North Plainfield, NJ 07060
- o W & W Software Sales, 6594 Swartout Rd. Algonac, MI 48001. We have 9 tapes with 5 programs each, with or without listings. Or get listings only so you can pick and choose any of the 45 available programs. Excellent variety, color, graphics, use of hand controller, and much more. Games, business programs, and teaching aides for children and adults. Send 25¢ for more information and a copy of Air Traffic Controller, or SAE for information only.

### BALLY APPLICATIONS SOFTWARE AND HARDWARE SOURCEBOOK

A Sourcebook of software programs and hardware items is in the process of being prepared. It will follow the general format of the TRS-80 and ATARI Sourcebooks but will also include hardware items for the BALLY as well. The Sourcebook should be ready for distribution by November 31st.

If you want to purchase a Sourcebook, please send a check for \$2.50 to Richard M. Houser  
635 Los Alamos Ave.  
Livermore, CA 94550

Quantity discounts will be available. (10 or more copies to one address.)

If you are a source of software programs and/or hardware items please contact Richard Houser at (415) 447-8493 between 4:30 and 9:00 PM PST for further information on how to get included in the Sourcebook.

- o DUNGEONS and DRAGONS program package: Eight programs plus a search routine combine to generate characters, personalities, a random dungeon, the rolls of dice, etc. \$8 postpaid on quality tape. R. Tietjens, 1008 Trinity #B, Seaside, CA 93955

NEXT ISSUE will contain some explanations of the ratings scheme and discuss the status of the other Projects. And we'll have some late word on the modem attachment to the Blue Ram.

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## ARCADIAN

Robert Fabris, relaxed  
3626 Morrie Dr.  
San Jose, CA 95127  
The Source TCD 959

FIRST CLASS

ON/OFF SWITCH as a possible source of computer problems has been identified by a subscriber. The spring-loaded contacts may corrode and have momentary failures. The real solution is to solder across the contacts and disconnect the unit at the wall plug. You should be aware that there is always current in the unit as long as the wall transformer is connected. The switch only shuts off part of the continuity.

CONTROLLER PROBLEMS. A number of subscribers have indicated problems with the hand controllers, especially in slots 3 and 4. If it is a problem only with the ports, then probably the I/O chip has a failure. Controller problems can usually be helped by cleaning. We have not been able to locate any controller source other than the list price outlets such as M.Wards.

CLUB NEWS The Chicago Area Group (p.1 for address) is starting a software library for their members.

RF MODULATOR is a gadget needed to convert the output of the Bally into a form usable by the TV set. One is included with your machine, it sits in the lower left corner and the shielded line going to your TV set originates there. Those of you who have purchased spare boards need one to get a visual display of what's going on inside the machine. Those I had last year are all gone, but I see the latest Poly Paks catalog has them for 17.95, part no. 92CU6527. The illustration appears to be identical to the Bally unit.

BALCHECK There is a very small interest by subscribers for the Balcheck tool, which requires someone to burn the program into a 2716 chip. If anyone is thinking of doing this, let me know.

GAME ENHANCEMENTS Virtually every program listed can be improved or modified. One designer has indicated that, for him, once the game has been made to operate to a sufficient degree of difficulty, the interest in further programming is lost and he begins to look for a new programming challenge. Now is the time for the game players to take over and revise the game to suit themselves.

PRINTED MATERIAL - Over the past years, we have located various pieces of material that pertain to the Bally Arcade. We have also been fortunate enough to have some technical types who have done research into the machine and documented their findings. These items are available for the cost of printing and postage, and a list with some descriptive material follows:

- o SERVICE MANUAL PA-1 This is a Bally-produced slick cover item subtitled "Fun and Brains". It describes the mechanical disassembly of the Arcade box, the parts list, the parts layout, and a schematic diagram. I get these in batches from Bally, and usually have a stock on hand. Cost is \$1.
- o SERVICE MANUAL PA-2 Also Bally-produced, it looks like PA-1 but the cover is a dull paper. It contains some not-useful data on the custom chips (clock

rates and timing diagrams, but not enough/right kind to do the experimenter much good.) Also has a schematic. I do not stock this, I'm just listing it for the record.

- o EXECUTIVE SOFTWARE In essence, a listing of software that does something in the Bally and how to execute it. Tom Wood disassembled the on-board RCM, and provides us with his findings. Part of the document lists the RCM subroutines that are executed by an RST 38H instruction, while the second part contains the listings from 0000-1FFF. 27 pages, \$2.50

- o HACKER'S GUIDE The Bally software design group made up a report of features not documented in the Bally BASIC instruction book. Virtually all of the data had been discussed in the first volume of the ARCADIAN before the release of this document as we discovered the features by experimentation. 21 pages, \$2.
- o MANUAL OF HARDWARE AND SOFTWARE The Bally software design group made up a large document explaining a number of subroutines, machine operations, and details of the interior workings. (it also contains the specifications of the custom chips, same as mentioned in PA-2 above). The second half provides the disassembly data for just about everything possible, including expanded on-board games data. The material is frustrating in that it occasionally discusses the "commercial" mode of operation - high resolution - that is only available with additional memory and a better operating system - capability beyond our current capacity. A shade over 300 pages, \$30.
- o BALCHEK A program was developed by the Bally software engineers which "locked at" the operation of the printed circuit board and determined if all was well, or if any problems existed. It would then identify the errant area. This program was placed into a 2716 chip and a couple of more parts added for a readout capability, and all boards would be inspected by this machine. Tom Wood ran this through his disassembler and has provided us with the listing, to which I have added the instructions. 60+pages, \$6.50
- BALLY
- o BALLY BASIC Tom Wood again, this time with the Tiny BASIC cartridge taken apart - 63 pages, \$6.50

PROGRAM ENHANCEMENTS occupy a goodly amount of space this issue. They have generally resulted from the material printed in Vol.2, pages 101,102, and page 4 of this volume.

- o To start with, on p. 101 we described machine code techniques that cause a blob to move back and forth on the screen - rapidly - without jerking or spoiling the picture also there, as an illustration of Blue Ram usage. Well, that clever mid-Westerner, Brett Bilbray, utilized the ideas presented there and invented the enclosed program which essentially does the same thing but uses Bally BASIC only. This means that those of you who don't have the Blue Ram as yet can see this interesting operation.
- o Next, Steve Walters used the identifier scheme mentioned on p. 102 and further discussed on p. 4 in conjunction with a no-memory storage scheme to get a nicer-appearing and more useful program.
- o Dave Ibach explains how to do a few tricks with the tape loading schemes he outlines.
- o John Perkins reveals a few more secrets about the Blue Ram memory addition, and has some words about using the Blue Ram for BASIC storage.

PROGRAM REVIEWS We have an on-going scheme to review programs submitted by persons wishing to sell them. The reviewers use a form (reduced copy is included in this issue), and then send me the summary that is included at the bottom of the form. I print the summary plus any other comments.

USER GROUP is being attempted in the New Jersey area. Contact Rob Rosenhouse at 201-755-2289 in the evenings for more data and location/time, etc. The group will probably be a part of the Amateur Computer Group of NJ, that holds meetings at the Union County Technical Institute.

BASIC-user interrupt service for Foreground/Background processing, by Brett Bilbray with an assist from Dave Ibach, based on the Blue Ram program of page 101.

FOREGROUND - BASIC operating

BACKGROUND - Machine vector movement and writing

PROGRAM:

10 CLEAR	230 D=12828; GOSUB C	450 D=16384; GOSUB C
20 A=19584;B=A;C=640	240 D=19770; GOSUB C	460 D=0; GOSUB C
30 D=-9741; GOSUB C	250 D=255; GOSUB C	470 D=2050; GOSUB C
40 D=19518;GOSUB C	260 D=6151; GOSUB C	480 D=-24566; GOSUB C
50 D=18413;GOSUB C	270 D=16205; GOSUB C	490 D=-30685; GOSUB C
60 D=-8130;GOSUB C	280 D=19768; GOSUB C	500 D=-21846;GOSUB C
70 D=3539;GOSUB C	290 D=19744;GOSUB C	510 D=-22846; GOSUB C
80 D=-1063;GOSUB C	300 D=6151; GOSUB C	520 D=8200; GOSUB C
90 D=201;GOSUB C	310 D=589; GOSUB C	530 D=2080; GOSUB C
100 A=19680	320 D=-7683; GOSUB C	540 D=8200; GOSUB C
110 D=19683;GOSUB C	330 D=-7715; GOSUB C	550 D=0; GOSUB C
120 A=19683	340 D=-11807; GOSUB C	560 D=-32735; GOSUB C
130 D=-20275;GOSUB C	350 D=-3647; GOSUB C	570 D=1280; GOSUB C
140 D=-3296;GOSUB C	360 D=31725;GOSUB C	580 D=0; GOSUB C
150 D=29677;GOSUB C	370 D=19568; GOSUB C	590 D=768; GOSUB C
160 D=19568;GOSUB C	380 D=-13829; GOSUB C	600 D=5; GOSUB C
170 D=28721;GOSUB C	390 A=19736	610 D=0; GOSUB C
180 D=-2740;GOSUB C	400 D=14367; GOSUB C	620 D=3; GOSUB C
190 D=10811;GOSUB C	410 D=9293; GOSUB C	630 CALL (B): STOP
200 D=-8731;GOSUB C	420 D=2125; GOSUB C	640 %(A)=d; A=A+2; RETURN
210 D=-539;GOSUB C	430 A=19744	
220 D=-9243;GOSUB C	440 D=-26624; GOSUB C	

Brett Bilbray  
14430 Barclay  
Dearborn MI 48126

By just inputting the above program, you will be able to use the BASIC while at the same time the object (generated by the program) will move about the screen at a speed controlled by KNOB #1.

DATAMAX UV-1 Zgrass University Machine" is the current name for the new Bally product mentioned here on p.84 of Vol 2. I understand that Bally builds the pieces and Datamax (350 N. Eric Dr. Palatine IL 60067) then assembles and markets it. The latest specs include: a Z80 microprocessor; 16K Screen Buffer RAM; 16K ROM that includes the ZGrass language; 32 K of user development RAM. 2 DC motor controllers (tape machine, movie or tv camera, etc.); 2 RS232 output ports for peripherals; disc drive interface; audio tape interface; and a card rack, allowing addition of other items. All of that plus more at 2495. Add a 13" color monitor at 695. This machine has been in development for the past couple of years, with the close cooperation of Dr. DeFanti of the University of Illinois who utilizes the Bally Arcade in his classes.

BYTE Magazine, in the November issue, has an article written by Dr. DeFanti which I found very interesting as it has a bit about the early history of the Bally.

REVIEWS OF OTHER COMPUTERS are requested from time to time. If you have access to one or another of the popular home computers and feel that you could write an honest comparison with the Bally, please let me know. This would be something to have done by mid-Summer, and I've a few ideas on format so that one could make some reasonable judgements by looking at a chart, table, etc.

Blue Ram Programming Tutorial. Many questions have arisen concerning the procedure for actually running programs written into the Blue Ram in machine code. Once a program (such as the one on page 101 of the ARCADIAN) has been entered into the Blue Ram via the Utility, how is it actually made to run? The RUN statement is used to run BASIC programs while the CALL statement is used to run machine code programs or routines. If the program in the Blue Ram was entered beginning at 6000H then a CALL 24576 will start that program running. Similarly, a program entered at 6100H can be run by the statement: CALL 24832 GO. The program on page 101 was entered beginning at 6000H, so a CALL 24576 GO will start it running. Note that the Blue Ram Utility has two means within it for running machine code programs: "GOSUB " followed by a four digit hexadecimal address will run a machine code program beginning at that address. Therefore, after entering the program on page 101, enter: GOSUB 6000 and the program will run. A GOSUB 6C00 will also run a program beginning at 6000H. The primary difference between GOSUB 6000 and GOSUB 6C00 is that a more complex program can be written and run using the GOSUB 6C00 entry because there is a routine at 6C00 in the Blue Ram (with the Utility loaded) that performs some special housekeeping of the Z80 registers to prevent the machine code program from upsetting the BASIC environment and clobbering the BASIC program. The GOSUB xxxx entry is a special form accepted by the Utility and it will not work from within a BASIC program. To run a machine code program from a BASIC program, the CALL nnnnn form must be used. In this case, nnnnn is the decimal equivalent of the hexadecimal address. 24576 is the decimal equivalent of 6000 hexadecimal. There is a conversion feature in the Blue Ram Utility that was inadvertently left out of the documentation: The left square-bracket [ can be entered while the Utility is running, followed by a four digit hexadecimal number and the Utility will print the decimal number equivalent. If less than four digits are used, press GO following the last digit to evoke the printout. This is especially useful when writing a machine code program at address 6450, for example, and then wondering how to run it from BASIC. The Utility would show [6450] = 25680 meaning that the machine code program at 6450H can be run by the statement: CALL25680 GO.

Blue Ram BASIC? Most Blue Ram owners are not adept at machine code programming, the major forte of the Blue Ram. Therefore we are investigating ways in which BASIC programmers and hackers can use the Blue Ram for BASIC program enhancement without having to learn any machine code. The Blue Ram owner's manual describes the procedure for using the Blue Ram memory for extended strings i.e. the %(nnnnn) statement, however there are two other ways a non-machine code programmer can extend a BASIC program. The first way consists of loading "service routines" into the Blue Ram through the Utility and then CALLing them from within the BASIC program. It is not necessary to understand how the service routine works, only how to call it. The calling sequence may require certain variables to be set up prior to the call and/or certain variables may be returned. Another fascinating possibility uses routines in the Blue Ram to extend the repertoire of BASIC statements and functions. Examples of both kinds of routines are given at the end of this paragraph. The second method for using

the Blue Ram in conjunction with BASIC programs is to enter some of the BASIC program into the Blue Ram and execute it from there. Up to 4219 additional bytes of program can be written this way for a total program length of over 6000 bytes (characters). The first step is to divide the overall program into two parts, one part for the normal 1800 byte BASIC memory and the other part for the Blue Ram. There are some restrictions on the Blue Ram part so plan the division very carefully. The following restrictions apply to Blue Ram BASIC program parts.

1. Direct GOTO and GOSUB cannot be made to Blue Ram program parts. Instead, an indirect linkage must be defined. In the normal BASIC part the linkage takes the form: CALLnnnnn where nnnnn is the decimal equivalent of the beginning address of the Blue Ram linkage part. The Blue Ram linkage part requires four bytes: 11 hh hh C9 where hh hh is the hexadecimal address of the beginning of the Blue Ram program part being linked to. Note that the hh hh is in reverse byte order. Example:

BASIC program part:	10 CLEAR ;CALL24576
	20 PRINT "ALL DONE"
Blue Ram program part:	6000 11 04 60 C9 3B 74 22
	6007 54 48 49 53 20 4D 45
	600E 53 53 41 47 45 20 49
	6015 53 20 46 52 4F 4D 20
	601C 54 48 45 20 42 4C 55
	6023 45 20 52 41 4D 22 3B
	602A 6E 32 30 0D

The contents of the Blue Ram part, after the linkage, is the ASCII equivalent of the BASIC statement:

```
;PRINT "THIS MESSAGE IS FROM THE BLUE RAM";GOTO 20
```

An editor for entering characters directly into the Blue Ram is being developed by Perkins Engineering to avoid having to cope with linkage programs and ASCII translations. The Blue Ram part will be entered, via the editor, in much the same way as Bally BASIC now accepts program statements.

2. Blue Ram statements are considered extensions of the statement which CALLS them. Therefore each such Blue Ram part statement CALLED from the normal BASIC part must begin with a semi-colon ; as a separator just as with any compound BASIC statement.

3. All transfers to Blue Ram program parts are via the CALLnnnnn statement. Instead of GOTO 2000 therefore, a CALL to 24576 is used. Where it is desired to reference a Blue Ram part as a subroutine, a dummy subroutine must be created in the normal BASIC part. The dummy subroutine will then transfer to the Blue Ram part. The Blue Ram part will contain the body of the subroutine as well as the RETURN statement. For example:

```
10 GOSUB 200;STOP
200 CALL24576

;PRINT "THIS IS A BLUE RAM SUBROUTINE";RETURN
```

The last "PRINT" statement is the example subroutine in the Blue Ram.

4. Line numbers have no meaning and cannot be referenced to access the Blue Ram program parts. However, since BASIC expects a line number after each "line" of program, pseudo line numbers must be used for multiple line Blue Ram program parts. For example:

```
;PRINT "THIS IS THE FIRST LINE"
xxPRINT "THIS IS THE SECOND LINE"
xxFOR N=1TO 20;PRINT N,NxN;NEXT N
```

The xx at the beginning of each additional line is a two character filler used to take the place (and space) of the normal line number. This must always be two characters and must always be present although the choice of characters is arbitrary. If ASCII numbers are used, they will be of more meaning in the listing. The editor being developed will include facilities for applying these pseudo line numbers and for dumping and loading the Blue Ram program parts as well as listing those parts. Bally BASIC will not directly acknowledge the Blue Ram program segments when performing normal :PRINT ;LIST or LIST functions. However, for experimenters, the following statement will render a listing of Blue Ram program parts entered in ASCII via the Blue Ram Utility:

```
FOR N=(first address) TO (last address);TV=%(N);NEXT N
```

The Blue Ram Utility can be used to dump these program parts to tape just as if they were machine code segments.

A Service Routine Library is underway and routines are solicited from anyone who can provide machine code and documentation for such routines. The routines should be of a general usage nature and fully documented in terms of what they do and how to CALL them. Initial allocations for the service routines will begin at address 6D00 (27904 decimal) and progress upward until that area is full. We will then start on another area. Of course not all routines need be loaded at once. The following are three candidate service routines to begin the library:

```
6D00 CD OF 6D 4E 06 00 D3
6D07 C0 ED 43 70 4E D3 40
6D0E C9 21 FF 6B ED 4B 6E
6D15 4E AF ED 42 C9 CD OF
6D1C 6D 3A 70 4E 77 C9
```

These two routines allow access to up to 3072 half-size strings, where each string entry can contain a positive number from 0 to 255 or a character. The string entry number is set into A and the

contents of the string is set into or retrieved from B. Example: A=14;B=QxN;CALL27930 stores the product of Q and N in half-string entry #14. FOR A=0TO 20;CALL27904;PRINT B;NEXT A will print the contents of the first 21 half-string entries. CALL27930 stores the contents of B into half-string entry A. CALL27904 fetches the contents of half-string entry A into B.

```
6D22 21 70 4E 06 FF 13 CD
6D29 CF 2F FE 3B 28 04 FE
6D30 OD 20 07 26 00 68 22
6D37 6E 4E C9 CB 74 28 E9
6D3E 04 BE 20 E5 26 00 18
6D45 E1
```

This routine compares the value in B with a list of possible matching characters and returns the matching list entry number in A. If no match is found, a number one larger than the list size is returned. The list is



placed in the statement immediately after the CALL address. For example: CALL27938,AXJKPTZ\$ causes the value in B to be compared against the possible choices: "A", "X", "J", "K", "P", "T", and "Z" (the ASCII values of these letters not the contents of the variables) and sets A to the number of the match if any. Suppose that B contained the character "K". The value returned in A would be a 3 because the letter "K" was the number 3 entry in the list beginning with 0 for A, 1 for X, etc. If B had contained a value not in the list, say "Q" for example, the number returned in A would be 7, one more than the last entry in the list. The comma after the address 27938 is a required separator and is not considered part of the list. The dollar sign at the end of the list is the list terminator and is also not considered part of the list. Any character may be used as the terminator but the list must contain the terminator for proper operation of the service. The list may be of any length within the normal limits of statement length. Here is a more complex example:

```
10 FOR C=0 TO 7
20 B=KP:TV=B
30 CALL27938,MARY DOE$
40 IF A=C NEXT C:STOP
50 PRINT "ERROR";GOTO 10
```

This example tests for the exact entry at the keyboard of the name MARY DOE. If any error is made along the way, the word ERROR is printed and the sequence is tried again.

By omitting the TV=B statement in line 20, this could be used as a secret password identifier. Only an exact spelling will pass. If you try to write a conventional program to do the same thing you will quickly see what a savings this service can be. And remember, routines in the Blue Ram are not lost during a RESET operation so these services can be kept on-line just like Bally BASIC. The same is true for Blue Ram BASIC program parts.

BLUE RAM NEWS. The next issue of the ARCADIAN will herald the arrival of the Blue Ram Modem Interface which is used to connect the Blue Ram to a Livermore Data Systems STAR modem. The modem and interface combination allows telephone communications between Bally owners, with local Computer Bulletin Boards, and with the mind-boggling world of the Source. A prototype of the modem interface has been working for over a month now and all that remains is pinning down the options and parts suppliers. A special communications program is in development which tailors the interface protocol to the Source formats and includes a 3 x 5 character set for a screen format of 40 characters by 14 lines, similar to APPLE's format. Also, a parallel interface to the Base, Model 800B printer is being considered as part of the modem interface to allow hardcopy printouts of text communications. The STAR modem is available from several dealers at \$139.

Please feel free to contact John Perkins with any technical or engineering or other questions concerning the Blue Ram or its support devices and programs. (804) 428-9092 Source ID TCV403.

CORRECTION to ADDITIONAL BASIC FEATURES on page 102. The two bytes (m) and (n) are backwards in the calculation which should read (n)x256+(m). This will change the numbers on the last line to 770 vice 515 resulting in: :INPUT 770 or :LIST 770.

BLUE RAM PROGRAM. New capabilities of the Bally Arcade with the Blue Ram add-on was the program topic at a recent meeting of the Tidewater Computer Club at Norfolk, Virginia. John Perkins of Perkins Engineering presented practical home uses of the Bally and the following accessories developed by Perkins Engineering: Blue Ram, Keyboard, Modem interface, BSR controller interface, and Music compiler. Inputs were made easily with the keyboard, complete with the fancy features of N-KEY ROLLOVER, REPEAT, CONTROL CHARACTERS, etc.

The BSR, a popular home device controller, was operated via the controller interface by the Bally executing a demonstration program. A lamp was controlled by the BSR, and, while the club watched, the lamp flashed on and off and slowly dimmed and brightened as the Bally processed a time table set of instructions. We discovered how convenient and perhaps economical it would be to control automatically the hours certain home devices are turned on and off.

Next, we listened with pleasure to several Bally compiled musical selections from Bach and Handel in three part harmony. It was explained that the compiler is used to translate a person's own composition or regular sheet music into a form that is played by the Bally.

Then, a quick phone call connected the Bally (with modem) to the Source, using the modem interface. The Source is a nationwide communication/information sharing network. Previous club programs demo'ed the Source, but never was such realtime excitement generated. First of all, everyone was able to read inputs/responses in large print on the T.V. Secondly, as we sampled the smorgasbord of Source information, a New Hampshire computer group broke in, wanting to "chat" with us! Well, when they discovered we were communicating via a Bally Arcade, we read across the screen, "YOU'VE GOT TO BE KIDDING."

Yes, Bally Arcade and Perkins Engineering brought us (and New Hampshire) some surprises that night!

P.S. Bally users are in a majority at club meetings, and new Bally users are invited to attend bimonthly at ECPI, Stanwick Building.

Karen P. Cravedi, VEEP

# ARCADIAN



```

1 .
2 .
3 .
4 .
5 .MASTERMIND
6 .BY BOB WISEMAN
10 :RETURN ;NT=1;CLEAR
20 BC=6;FC=0
100 PRINT ;PRINT "THE GAME OF MASTERMIND";PRINT
110 PRINT "COLOR CODES:"
120 R=1200;GOSUB R;PRINT "R=RED      G=GREEN"
140 GOSUB R;PRINT "O=ORANGE  B=BLUE"
150 GOSUB R;PRINT "Y=YELLOW  P=PURPLE"
180 M=0
190 FOR N=1TO 4;@(N)=RND (6);NEXT N
192 PRINT "YOUR MOVE"
195 M=M+1
196 IF M=10GOTO 1000
220 FOR N=4bM+1TO 4bM+4
240 G=KP;TV=G
245 IF G=81GOTO 1000
250 IF G=89BC=126;@(N)=1;GOTO 400
260 IF G=82BC=98;@(N)=2;GOTO 400
270 IF G=71BC=156;@(N)=3;GOTO 400
280 IF G=80BC=43;@(N)=4;GOTO 400
290 IF G=79BC=110;@(N)=5;GOTO 400
300 IF G=66BC=249;@(N)=6;GOTO 400
310 TV=31;TV=63;TV=31;GOTO 240
400 NEXT N
410 B=0;W=0
420 FOR Z=1TO 4
421 P=Mb4+Z
423 IF @(P)=@(Z)B=B+1;@(P)=@(P)+14;@(Z)=@(Z)+7
425 NEXT Z
426 FOR Z=1TO 4;P=Mb4+Z
430 FOR N=1TO 4
435 IF Z=NGOTO 470
440 IF @(N)@@(P)GOTO 470
450 @(P)=@(P)+14
455 @(N)=@(N)+7
460 W=W+1;GOTO 500
470 NEXT N
500 NEXT Z
502 FOR N=1TO 4;IF @(N)>6@(N)=@(N)-7
504 NEXT N
510 PRINT #4,B," BLACK",#2,W," WHITE"
522 Z=10bB+W;NT=0
524 FOR N=-ZTO 1STEP -1
525 &(22)=-32700
526 &(16)=Nb2;NEXT N
528 &(16)=0;NT=1
530 IF B<4GOTO 195
900 PRINT "YOU WIN"
910 NT=0;FOR Z=400TO 1STEP -4
915 &(22)=-32760
920 &(16)=Z;&(17)=Zc2
930 NEXT Z;NT=1

```

Bob Wiseman  
118 St. Andrews Dr.  
Cincinnati, OH 45245

In this version of MASTERMIND, the computer holds a four-color code that you must guess. Enter the first letter of each color guessed via the keypad. Each BLACK response means a correct color in the correct spot, while a WHITE response means a correct color in the wrong spot.

```

935 &(22)=0;&(16)=0;&(17)=0
940 A=KP;GOTO 10
1000 PRINT "TOO MANY TRIES"
1002 FOR Z=1TO 400STEP 4
1004 &(22)=-32760
1006 &(16)=Z;&(17)=Zc2;&(18)=Zc10
1008 NEXT Z
1009 &(16)=0;&(22)=0;&(17)=0;&(18)=0;NT=1
1010 PRINT "THE CODE WAS:"
1020 FOR N=1TO 4
1030 Z=@(N)
1040 IF Z=1PRINT "YELLOW "
1050 IF Z=2PRINT "RED "
1060 IF Z=3PRINT "GREEN "
1070 IF Z=4PRINT "PURPLE "
1080 IF Z=5PRINT "ORANGE "
1090 IF Z=6PRINT "BLUE "
1095 NEXT N;A=KP;GOTO 10
1200 CX=-50;A=FTURN

```

Bally Basic

By: Steve Walters  
556 Langfield  
Northville, MI 48167

## PROGRAM TITLE & INSTRUCTIONS WITHOUT USING MEMORY

Bally Basic programs, especially games, are nicer for the user if a title and operating instructions appear on the screen to start the operation. This lets the tape be loaded and used by a new player without having to refer to a paper instruction sheet. However, there is often a frustrating trade-off between the program instructions we would like to display, and the memory capacity we finally need for a good operating program.

The procedure described below will allow you to display a title at the beginning of the tape load, and up to nine lines of title and/or instructions at the end of the tape load, without using any memory space. The specified input command (e.g., :INPUT 2) is used to control this process.

Loading the program. When the operating program is ready to store permanently onto tape, set NT=1 (type in NT=1 and press GO). Then enter the following:

```
:PRINT; TV=0; TV=1; PRINT; PRINT "PROGRAM TITLE"; PRINT "BY PROGRAM AUTHOR";  
PRINT; LIST; PRINT; PRINT "STANDBY-"; PRINT; PRINT ":RETURN; :INPUT 2"
```

Do not press GO at this point. With the above entered, start the tape recorder on record, and when the leader has gone by press GO. You will see ?? which are the TV numbers for the input number command, followed by the title and author, then the normal program listing, then STANDBY-, and then :RETURN; :INPUT 2. As soon as this last statement appears on the screen, turn the tape recorder off without entering anything else, and leave the tape cartridge at the position at which it was turned off.

The following should be noted in using the above procedure:

- the TV instruction shown is an example, since TV=0; TV=1 sets up an input code which will input only on the instruction :INPUT 1 (see ARCADIAN page 102). Use whatever TV code you want for your program input instruction.
- put whatever information you want in the PROGRAM TITLE and PROGRAM AUTHOR lines, within the limit of the buffer space. If the keypad entry locks out on you before you have entered the above material, then you have put too many characters in these two lines.
- the last instruction :RETURN; :INPUT 2 closes the IO port and then waits to re-open it when it finds the proper TV input code. The above sample uses 2 as an example. If more than one program is included on a tape, both of the input codes for each program should be unique values, used only once on the tape.

Loading the message. A separate program is now used to load the message onto the tape which you want to appear after the program load but before the program operation begins, such as the title and playing instructions. Press RESET to clear out the operating program, and then enter the following:

```

10 CLEAR
20 TV=0; TV=2                                (this should correspond to the value in the last
30 PRINT; PRINT                                statement of the program load sequence)
40 PRINT ".PROGRAM TITLE"
50 PRINT ".PROGRAM AUTHOR"                    (each line of message should contain no more than
60 PRINT "*****"                                23 characters/spaces after the period)
70 PRINT ".INSTRUCTIONS"
80 PRINT ".INSTRUCTIONS"
90 PRINT ".INSTRUCTIONS"
100 PRINT ".INSTRUCTIONS"
110 PRINT ".INSTRUCTIONS"
120 PRINT ".TO START PUSH KEY 1"                (see note a)
130 PRINT ":RETURN; NT=0; BC=133; K=KP; GOTO 1"    (see note b)

```

All message lines (Line 40 thru Line 110) must be used to fill the screen and scroll unwanted material out of sight. If you do not need all the lines, or want spaces between parts of the instructions, write PRINT only in that line.

When the message loading program is ready to record onto the tape, enter :PRINT; RUN without pressing GO. Then start the tape on record and press GO. As soon as the material in Line 130 appears on the screen, turn the tape recorder off without entering anything more.

The tape is now ready to input and display the message.

- (a) Line 120 is based on the key-press in Line 130 being used to start the main program operation. This requires no memory space. However, I usually prefer to have the hand controller operate everything if possible, which requires a line in the operating program, as follows:

- (1) change Line 120 in the above message program to

```
120 PRINT ".TO START PULL TRIGGER" and eliminate K=KP in Line 130.
```

- (2) add this line to the operating program:

```
1 BOX 0,-32,159,7,2; IF TR(1)#1 GOTO 1
```

The BOX instruction is not necessary, but it blanks out the material which was printed by Line 130 in the message program, for a nice screen display. Line 1 in the program simply loops on itself while the player is reading the message, until he pulls the trigger. A CLEAR instruction will probably be needed at the next operating line.

- (b) Line 130 contains some items as examples. If you need NT set at a specific value, or a color set, a value set (e.g., A=200) or other item once at the beginning of the operating program, it can be done as part of Line 130 without using program memory space. Be careful about the length of Line 130, since it will cause the message to scroll out of sight if it is too long. You could use two lines for this if needed.

```

1  . DAY-OF-THE-WEEK
2  . AND
3  . CALENDAR PROGRAM
4  .
5  . BY KIRK GREGG
6  . SEPTEMBER '80
7  .
8  . RETURN
9
10 CLEAR:LIST 2,3
20 PRINT:PRINT " ENTER ANY DATE BETWEEN
30 PRINT " 1-1-1583 & 12-31-9999
40 PRINT:INPUT " MONTH (1-12)?"M
50 IF (M<1)+(M>12)GOTO 810
60 N=31:IF M=2 N=29
70 IF (M=9)+(M=4)+(M=6)+(M=11) N=30
80 PRINT #1," DAY (1-"N",:INPUT ")?"D
90 IF (D<1)+(D>N)GOTO 840
100 INPUT " YEAR(1583-9999)?"Y
110 IF (Y<1583)+(Y>9999)GOTO 870
120 IF M#2 GOTO 150
130 X=Y/4:IF RM#0 GOTO 140
135 X=Y/100:IF RM#0 GOTO 150
138 X=Y/400:IF RM#0 GOTO 900
137 GOTO 150
140 N=N-1:IF D=29 GOTO 900
150 Z=Y:K=M:E=D:IF M<3 M=M+12:Y=Y-1
160 GOSUB 510
170 I=RM:IF I=0 I=7
180 D=1:GOSUB 510
190 L=RM:IF L=0 L=7
200 W=1:IF L=1 W=0
201 .
202 . PRINT CALENDAR
203
210 NT=0: CLEAR:FC=RNND(244):BC=FC+12
220 CX=-40:CY=39:GOSUB 600+K
230 PRINT #6,7:BOX 0,39,141,9,3
240 X=(L-1)*20-62:Y=28
250 FOR C=1 TO N
260 CX=X:CY=Y:PRINT #2,C,
270 IF X=-62 W=W+1
280 L=L+1:X=X+20
290
290 IF L>7 X=-62:Y=Y-11:L=1
300 NEXT C
301 .
302 . DRAW MATRIX
303 .
304 X=70:Y=23
310 FOR C=1 TO W
320 LINE -X,Y,0
330 LINE X,Y,1
340 Y=Y+11:NEXT C
350 Y=34-W*11
360 V=Y-11:NEXT C
370 FOR C=-70 TO 70 STEP 20
380 LINE C,34,0
390 LINE C,Y,1:NEXT C
400 .
401 . PRINT DAY NAME
402 .
403 CX=-40:CY=-40
410 PRINT #2,E," => ",:GOSUB 700+I
420
430 .
431 . ASK IF DONE
432 .
440 K=KP: CLEAR:PRINT
441 PRINT " ANY MORE (Y/N) ? ",K=KP
450 IF K#78 CLEAR:PRINT:NT=3:GOTO 40
460
470 .
471 . END OF JOB
472 .
473 PRINT:PRINT:PRINT " HAVE A BEAUTIFUL DAY!
480 STOP
490
500 .
501 . CALCULATE D.O.W.
502 .
510 X=(D+2*M+Y+6*(M+1)/10+2-Y/100+Y/400+Y/4)/7: RETURN

```

# ARCADIAN



```

598 .
599 .MONTH NAMES
600 .
601 PRINT "JANUARY",;RETURN
602 PRINT "FEBRUARY",;RETURN
603 PRINT "MARCH",;RETURN
604 PRINT "APRIL",;RETURN
605 PRINT "MAY",;RETURN
606 PRINT "JUNE",;RETURN
607 PRINT "JULY",;RETURN
608 PRINT "AUGUST",;RETURN
609 PRINT "SEPTEMBER",;RETURN
610 PRINT "OCTOBER",;RETURN
611 PRINT "NOVEMBER",;RETURN
612 PRINT "DECEMBER",;RETURN
698 .
699 .DAY NAMES
700 .
701 PRINT "SUNDAY",;RETURN
702 PRINT "MONDAY",;RETURN
703 PRINT "TUESDAY",;RETURN
704 PRINT "WEDNESDAY",;RETURN
705 PRINT "THURSDAY",;RETURN
706 PRINT "FRIDAY",;RETURN
707 PRINT "SATURDAY",;RETURN
800 .
801 .ERROR MESSAGES
802 .
810 PRINT;PRINT " INVALID MONTH!!
820 PRINT " 1 TO 12 ONLY PLEASE!!
830 FOR C=1 TO 450;NEXT C;CLEAR;PRINT;GOTO 40
840 PRINT;PRINT " INVALID DAY!! ",
850 GOSUB 600+M
860 PRINT;PRINT #3," HAS ONLY",N," DAYS!!";GOTO 80
870 PRINT;PRINT " INVALID YEAR!!
880 PRINT " 1583 TO 9999 ONLY PLEASE!
890 PRINT;GOTO 100
900 PRINT;PRINT " INVALID DATE!!
910 PRINT;PRINT #6,Y," IS NOT A LEAP YEAR!!
920 GOTO 830

```

## AD:

o Sound Quality Enhancement - Here's a full range of sound from your Bally with the Sound System I Audio Add-on. Connects to expansion port; cable and connector included. Features 4-8 ohm speaker output, 2 pre-amp outputs, headphone jack, on/off volume control, and 117v operation. Advise if you have a Blue Ram. Only \$28, wired and tested, plus \$3 postage/UPS.

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Alternative Engineering, 1 Gilbert Dr. Chelsea, ME 04330

# TUTORIAL: TAPING MEMORY

by Dave Ibach

Here is an alternate way to put your program on tape:

```

>A=-24576
>B=%{20050}
>PRINT B
      nnnnnn -----> use it here ----->
>NT=1;PRINT;PRINT °.°;PRINT °A=-24576;B=nnnnnn;
FOR N=A TO B;%(N)=KP;NEXT N;%(20050)=B;
:RETURN;RUN°;FOR N=A TO B;CY=40;TV=%(N);
NEXT N;:RETURN get tape moving then press G0

```

Dave Ibach  
19553 Dartmouth Pl.  
Northville, MI 48167

The program can be loaded from tape to memory by using the standard :INPUT command.

Why would you want to do it this way? First, the program doesn't list on the screen during loading. If you have a program that holds surprises for those who play, such as the printing of clever remarks, you might not want to reveal the program listing during loading.

Second, you can easily include the contents of the string variable with this approach. Do it this way:

```

>A=-24576
>B=%{20050}
>C=B+2x{the number of string variables desired
      including @{} }
>PRINT B
      nnnnnn -----> use it here ----->
>PRINT C
      mmmmmm -----> use it here ----->
>NT=1
>:PRINT;PRINT °.°;PRINT °A=-24576;C=mmmmmm;
FOR N=A TO C;%(N)=KP;NEXT N;%(20050)=nnnnnn;
:RETURN;RUN°;FOR N=A TO C;CY=40;TV=%(N);
NEXT N;:RETURN get tape moving then press G0

```

A third reason for taping your programs in this fashion is to save memory. The remainder of this tutorial will explain how.

In your program, you use statement numbers for three reasons:

1. As the object of a GOTO or GOSUB
2. To terminate the scope of an IF statement
3. The input buffer doesn't allow a statement to be greater in length than 102 keystrokes.

Each time you are constrained by #3, you are throwing away two memory locations. In addition, if you are storing data in





the first few lines {as George Moses does in his music tapes}, it can be particularly annoying to have to deal with statement numbers that recur too frequently. To get rid of these extraneous statement numbers:

1. Make a handwritten list of the statement numbers that exist for this reason.
2. Rewrite each one of these statements inserting a semi-colon after the statement number. This is done so that we can concatenate the text to the previous statement. This step is unnecessary for data lines.
3. Squeeze out statement number  $x$  like this:

```
>FOR N=-24576 TO 0:IF %N)*XNEXT N
>FOR I=N-1 TO -22775STEP 2:%I=%I+3:NEXT I;
%{20050}=%{20050}-3
```

[Hint: to avoid the tedium of doing step 3 repeatedly, make these the first two statements of your program, even if you have to borrow the space by temporarily eliminating other lines:

```
1 INPUT "STMT # TO ELIMINATE?"A;FOR
N=-24576 TO 0:IF %N)*A NEXT N
2 FOR I=N-1 TO -22775STEP 2:%I=%I+3:NEXT I;
%{20050}=%{20050}-3;STOP
```

Now simply RUN once for each statement number you wish to eliminate.

4. Et voila, it's done! If you followed the previous hint, take out lines 1 and 2 and restore any lines you may have temporarily removed.

Now your program is listable, executable, and smaller in size. PRINT SZ if you are skeptical.

But you can't write it to tape and reload using the normal technique, because some of the statements are now too big for the buffer. You'll have to write it to tape using one of the techniques given at the beginning of this tutorial.

# ARCADIAN

HORSEACE by Paul Slezak

```

5 NT=0;CLEAR ;FC=155;BC=160;N=0;FOR Z=1TO 4;@(Z+20)=500;NEXT Z;&(9)=180
10 CY=5;PRINT "WELCOME TO ARLINGDUNG PARK";INPUT " # OF PLAYERS? (1-4)"A;IF A>4
GOTO 10
15 GOSUB 290
20 CLEAR ;CX=-20;PRINT "RACE #";PRINT #1,N;T=0;S=0;GOSUB 600
30 FOR Z=1TO 8;PRINT #2,Z;@(Z+8)=RND (5)+RND (3)+1;CX=38;PRINT #1, @(Z+8);CX=
45;PRINT "1";CX=-50;GOTO 30+Z
31 PRINT "ALBADEXTER";NEXT Z
32 PRINT "JO L IN";NEXT Z
33 PRINT "C BICUSPID";NEXT Z
34 PRINT "SEATTLE SLEWED";NEXT Z
35 PRINT "WOMAN O' WAR";NEXT Z
36 PRINT "DUSTY PAUL";NEXT Z
37 PRINT "DIABLO";NEXT Z
38 PRINT "SECRETARYLESS";NEXT Z
40 FOR Z=1TO A;IF @(Z+20)=0@ (Z+16)=0;NEXT Z;GOTO 100
50 CY=-32;PRINT "PLAYER #";PRINT #1,Z;CX=-20;INPUT B;CY=-32;CX=10;INPUT C
60 IF B>0IF B<10GOTO 80
70 GOTO 50
80 IF C>0@ (Z+20)CY=-32;PRINT "SORRY, I'M NO LOAN SHARK";GOSUB 610;CY=-32;FOR D=1
TO 23;PRINT " ";NEXT D;CX=-78;GOTO 50
90 @ (Z+16)=B;@ (Z+20)=@ (Z+20)-C;@ (Z+24)=C;NEXT Z
100 FC=160;NT=5;PRINT "146 641 641 641000000";CLEAR ;NT=0;FC=155;CY=35
110 FOR Z=1TO 10;CX=70;GOTO 110+Z
111 PRINT "X";NEXT Z
112 PRINT "X";NEXT Z
113 PRINT "F";NEXT Z
114 PRINT "I";NEXT Z
115 PRINT "N";NEXT Z
116 PRINT "I";NEXT Z
117 PRINT "S";NEXT Z
118 PRINT "H";NEXT Z
119 PRINT "X";NEXT Z
120 PRINT "X";NEXT Z
130 CY=25;FOR Z=1TO 8;PRINT #2,Z;CX=-60;PRINT " ";NEXT Z;GOSUB 610
140 CY=25;FOR Z=1TO 8;CX=-60;PRINT " ";NEXT Z
150 NT=1;&(20)=50;&(21)=205;FOR Z=1TO 35;MU="V";NEXT Z;NT=0;&(20)=0;&(21)=0;CY=
25;FOR Z=1TO 8;PRINT " ";NEXT Z
155 CY=0;PRINT "..AND THEY'RE OFF!!";GOSUB 610;CY=0;PRINT " 19 SPACES "
160 GOSUB 610
170 CY=25;FOR Z=1TO 8;@(Z)=@ (Z)+(RND (4)+8-RND (5))-(RND (@ (Z+8)));CX=@ (Z);PR
INT #1,Z;IF @ (Z)>655=1
175 NEXT Z;GOSUB 610
180 IF S=1GOTO 200
190 CY=25;GOSUB 620;GOTO 160
200 G=0;FOR Z=1TO 8;IF G>@ (Z)NEXT Z;GOTO 220
210 X=Z;G=@ (Z);M=@ (Z+8);NEXT Z
220 B=0;FOR Z=1TO 8;IF @ (Z)>658=B+1
230 NEXT Z;IF B>1GOSUB 500
240 CLEAR ;CY=0;PRINT "THE WINNER IS #";PRINT #2,X;GOSUB 610
250 FOR Z=1TO A;IF @ (Z+16)=X@ (Z+20)=@ (Z+24)B=M+@ (Z+20)
260 NEXT Z
290 CLEAR ;CX=-30;PRINT "YOU HAVE"

```

Paul Slezak  
1818 S. 59th Ave  
Cicero, IL 60650

# ARCADIAN

```

300 FOR Z=1TO A;PRINT "PLAYER #",;PRINT #1,Z;PRINT #2," $",;PRINT #2,@(Z+20);N
EXT Z
310 FOR Z=1TO 3000;NEXT Z
320 IF N>8GOTO 400
330 N=N+1;IF N>8GOTO 20
340 RETURN
400 CLEAR ;FC=79;BC=82;CY=16;CX=-35;PRINT "RACES OVER!!";PRINT ;PRINT
410 PRINT "IF YOU WANT 9 MORE RACES   PRESS 1";A=KP;IF A#49STOP
420 GOTO 5
500 FOR Z=1TO 6;CLEAR ;FC=212;BC=209;CY=0;CX=-35;PRINT "PHOTO FINISH";NEXT Z;BC
=160;FC=155
510 RETURN
600 FOR Z=1TO 8;@(Z)=-78;NEXT Z;RETURN
610 FOR F=1TO 300;NEXT F;RETURN
620 FOR D=1TO 8;CX=@(D);PRINT " ";NEXT D;RETURN

```

REVIEW FORM is shown below. This will give you the code for the various numbers used and the categories.

## BALLY PROGRAM REVIEW

Date:-----  
 Name of Program:-----Cassette Name-----  
 Description:-----  
 Source:-----Price-----  
 Reviewed by:-----Ase:-----

Circle score for each item 0 1 2 3 4 5 6 7 8 9 on scoring line.

### PROGRAM DOCUMENTATION (PD)

No Instructions 0 1 2 3 4 5 6 7 8 9      Very Clear Description  
 Listing,Flowchart,Instructions

### PROGRAM POLISH (PP)

Sloppy; Amateurish 0 1 2 3 4 5 6 7 8 9      Professional

### USE OF SPECIAL FEATURES (USF)

Minimal Used 0 1 2 3 4 5 6 7 8 9      Great Use of Features  
 Graphics, Sound, Handles

### LEVEL OF CHALLENGE (LC)

Not Challenging 0 1 2 3 4 5 6 7 8 9      Very Challenging

### ORIGINALITY AND CREATIVITY (OC)

Adapted, Same Old Stuff 0 1 2 3 4 5 6 7 8 9      Totally Brilliant and Unique

### LEVEL OF INTEREST (LI)

Boring 0 1 2 3 4 5 6 7 8 9      Fascinating

### EDUCATIONAL VALUE (EV)

Little 0 1 2 3 4 5 6 7 8 9      Really Learn Facts  
 and Skills

### EASE OF USE (EU)

Awkward, Inconvenient 0 1 2 3 4 5 6 7 8 9      Easy, Quick, Convenient

### OVERALL VALUE (OV)

Almost Worthless 0 1 2 3 4 5 6 7 8 9      Everyone Should Buy

## CASSETTE REVIEW

Date: 8/30/88

CASSETTE NAME: Program Tape #2  
 PROGRAMS ON CASSETTE: Wumpus 3.1; Blackjack II; Life 4.2; File Create;  
 Tape Input/Output; Text Editor; Biorhythm 3.0

CASSETTE PRICE: \$10.00

LISTING PRICE: Not Available

SOURCE Name: Mark Keller

Address: 9536 Shumway Drive

City: Orangevale

State: CA

ZIP: 95662

Reviewed by Bill Rueger Age 31

PROGRAM NAME: Wumpus 3.1

DESCRIPTION: This is a very good version of Wumpus. Perhaps the best feature is that it allows you to program your own cave sequence and also to save it on tape for later use. This is done using the Tape Input/Output program that follows. This attribute, and the documentation, is worth the price of the cassette alone.

RATING % based on applicable rating items. 53/72 = 73.6%

PD= 7 PP= 8 USF= 5 LC= 6 OC= 7 LI= 6 EV= XX EU= 7 OV= 7

Time to play 10-30 min. For ages All # of players 1

PROGRAM NAME: Blackjack II

DESCRIPTION: This program implements the game of Blackjack for one player vs. the computer. The rules are the same as the casinos with the exception that if you split your cards the dealer will play against each hand after you stand on it. The dealer also alternates between two decks and only deals the top 26 cards from each deck. If you do not already have the Blackjack Videocade, this version is very good, minus the graphics and multi-player capability. It also allows for insurance as do the casinos.

RATING % based on applicable rating items. 42/72 = 58.3%

PD= 7 PP= 8 USF= 1 LC= 5 OC= 5 LI= 5 EV= XX EU= 6 OV= 5

Time to play Variable For ages 10 up # of players 1

PROGRAM NAME: Life 4.2

DESCRIPTION: While not as fast and graphically "clear" as other versions I have encountered, this version does have some helpful features that make it a must for any Life addict to acquire. It has the ability to stop the program at the end of a generation and change or insert additional colonies. The program can then continue at the generation it was on. It also allows you to set up the program visually through keyboard entry, eliminating the need to use graph paper and co-ordinates.

RATING % based on applicable rating items. 39/63 = 60.3%

PD= 6 PP= 7 USF= 4 LC= XX OC= 5 LI= 5 EV= XX EU= 6 OV= 5

Time to play For ages All # of players

PROGRAM NAME: File Create

DESCRIPTION: Allows you to make files of string data. This is a very useful program which allows you to create data records for later use. For example, you can create a file of cave locations to be used with the Wumpus Program. This can be stored on tape and used whenever you wish. A most interesting program, with good documentation on how it's down.

RATING % based on applicable rating items. 50/63 = 79.4%

PD= 4 PP= 8 USF= XX LC= XX OC= 9 LI= 7 EV= 8 EU= 6 OV= 8

Time to play For ages # of players

# ARCADIAN

PROGRAM NAME: Tape Input/ Output  
 DESCRIPTION: This program lets you make copies and also enter them into the computer of Data Files. It is used in conjunction with the File Create program. It is an excellent program with Documentation on "how it works".

RATING % based on applicable rating items. 49/ 54 = 90.7%  
 PD= 8 PP= 9 USF= XX LC= XX OC= 8 LI= XX EV= 8 EU= 8 OV= 8  
 Time to play \_\_\_\_\_ For ages \_\_\_\_\_ # of players \_\_\_\_\_

PROGRAM NAME: Text Editor  
 DESCRIPTION: This is another useful program that allows you to edit each line in your program to correct errors, make changes etc. It takes up only 300 bytes so can be used with lengthy programs. It lets you access any line in a program and edit it without having to retype the entire line. A must for anyone who writes his own programs.

RATING % based on applicable rating items. 50/ 54 = 92.6%  
 PU= 8 PP= 9 USF= XX LC= XX OC= 8 LI= XX EV= 9 EU= 9 OV= 8  
 Time to play \_\_\_\_\_ For ages \_\_\_\_\_ # of players \_\_\_\_\_

PROGRAM NAME: Biorhythm 3.0  
 DESCRIPTION: This program plots your particular Biorhythm for a given month and day. It does so by graphic display. It also includes "experimental" cycles of Health, Sex, Precognition, and Natural High. It is a very graphic program and easy to read.

RATING % based on applicable rating items. 49/ 63 = 77.8%  
 PD= 7 PP= 7 USF= 7 LC= XX OC= 7 LI= 7 EV= 0 EU= 7 OV= 7  
 Time to play \_\_\_\_\_ For ages All # of players 1

PHILOSOPHY A bit of space otherwise unoccupied, so I shall inject a few words... There is no single place that one can go to for full information about the Bally Arcade, or its version of Palo Alto Tiny BASIC. There is no book that will convert from any other dialect of Tiny BASIC (upwards of 400) into Bally BASIC. Effort in this area requires a lot of cut-and-try, and certainly an understanding of what was intended by the originating programmer. That is, you have to know what he had in mind when he wrote the program. I have tried to fill the void of understanding how/why the Bally works the way it does with the ARCADIAN, and through the help of a lot of contributors, we have been able to document quite a bit, and to begin to understand its operation. All this material is included in the earlier issues of the ARCADIAN, from the first one to the latest. Those of you who are new subscribers should avail yourselves of the material that is in the first two volumes, because it is not my intent to reinvent the wheel every year and go over that material. Aside from the knowledge you will obtain, there are some really great programs in there, like Collins' Checkers, or Perkins' Ojello, to pick a couple. If someone were really ambitious, they could extract the tutorial material, and the game material, and produce a sort of digest, but not me. Dick Hauser has put a lot of games on tape, so part of that has been done already. Back issues are available at \$10 for each year, 1979 and 1980.

ADS:

- Programs available: Mastermind(1 player); Spell and Score(2); Slot Machine(1); Craps (1); Checkbook Balancer; Russian Roulette (to 10); above 2.50 each. Dragon Hunt (1) 1.50 - try to find the invisible dragon on a 10x10 table. Prices are for listing or for recording on your tape. All old programs revised and improved, and all programs come with complete instructions, guaranteed bug-free. S.Walpole, 11480 Beirut Ct. #204, Sappington, MO 63126
- Bally Software: Memory Maze (1-2 players) study the maze, then try to move thru it when it is invisible. scoring, color, music. Crazyface - Bally draws chinaman, football player, witch, singer, mountie; then you move hats, eyes, noses, mouths, necks to develop your own crazy faces. Hidden Word Finder - manipulates a hidden word puzzle. All three on tape plus full documentation 7.95: S.Walters, 556 Langfield, Northville MI 48167

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AN EXPANDED ISSUE this time as a number of good items came in. Also, the expected postal rate increase is apparently a bit off, so I have some excess money which is going into the larger volume of printing and postage.

BUT I'm also drained out of material, so please keep the programs and tutorials coming in for our mutual understanding.

The SOURCE is mentioned a couple of times inside, it is composed of a giant computer having lots of data stored in it, such as the latest stock reports, UPI news reports on both national and local levels, a New York Times data bank, lots more. It also allows classified ads to be placed or read, private letters between subscribers, or 'face-to-face' talking. You can use it as a word processor or a computer, then store your work 'till another day. All you need is a computer terminal (Bally and TV screen) and a Modem to tie to the telephone lines. Full details in the next issue.

HAPPY HOLIDAYS to you all!!!

30

ARCADIAN

The SOURCE TCD 959  
Robert Fabris, joyous at Noel  
3626 Morrie Dr.  
San Jose, CA 95127

FIRST CLASS

CES The Winter Consumer Electronic Show is going on as this issue is being mailed out, and I'll report on any firm AstroVision developments next month. Rumors are available now, such as plans to have five games out in January, plus two more by July. One of these will be a Galaxian game, based on the arcade game. George Moses is helping with the MUSIC cartridge. Rumor also has it that the very-long-awaited keyboard/memory addition is at the FCC for approval, and seems to have a \$600 price tag.

INTERACTIVE COMPUTER OPERATION has finally been accomplished by two Bally owners. A tape program was loaded into one machine and transferred to the other through an amplifier. Then the users/machines alternated activities, transferring choices, etc., from one machine to the other. More details as I get them.

SCREEN POSITION. I've had an occasional query about the control - or lack of control- of the horizontal position of the display. Has anyone come up with a method to move the display to the left about one character (above and beyond the TV's horizontal control)?

BLUE RAM ENHANCEMENTS are discussed on pp 36 and 37. As you will read, a breakthrough has been made where now Bally BASIC programs can be stored in the Blue Ram, allowing the full use of the 4K memory for Basic statements. It had been thought earlier that only machine codes could be stored there, but this new technique now allows expansion of programs by all users, not just those adept at machine language.

A new product is the electronics for a modem attachment. The modem (M<sup>o</sup>dulator-DEModulator) is a device that converts data pulses of the computer into audio tones understandable by the telephone system, and vice versa. These can be either a kind that you physically place the telephone handset into, or a kind that plugs into the telephone wall jack. Once you have tied into the telephone line, you can communicate with virtually any other so-connected computer. The electronics discussed on p. 37 will work with the Livermore STAR, and may work with others. The major problem is lack of standardization of computer equipment.

POPULAR COMPUTER DESCRIPTIONS are contained in Creative Computing, Dec.80. These are not feature-for-feature comparisons with good/bad points outlined, but individual reviews of each of the most popular systems. There is also a tabulated section that makes specification comparisons (memory size, price, etc.). Another article discusses some of the various BASIC language dialects.

TITLE/INSTRUCTION PROGRAM Corrections were received from Steve Walters for his utility program, printed on p.20. The program to be loaded should read as follows:

```
:PRINT; TV=0; TV=1; PRINT; PRINT ".PROGRAM TITLE", PRINT ".BY AUTHOR";
PRINT; LIST; PRINT; PRINT ".STANDBY FOR "; PRINT ":RETURN;:INPUT 2"
```

When this is entered, the fourth line of the fourth paragraph, p.20, will read -  
 .STANDEY FOR :RETURN; :INPUT 2

#### A Byte-saving Hint

If you have unused variables (A thru Z) you can set them equal to the recurring numbers in your program. This saves 1 byte each time a 2-digit number is used, 2 bytes each time a 3-digit number is used, etc. Furthermore, since these variables can be set during the tape loading rather than as a part of the program content itself, it does not take any program memory space to set them. Since they are not affected by stopping and re-running the program, the procedure works nicely.

THE SOURCE IS A SERVICE COMPRISING A VERY LARGE DATA BANK THAT CAN BE ACCESSED BY A COMPUTER HAVING A TELEPHONE CONNECTION. AS A SERVICE, THERE IS A ONE-TIME CONNECT CHARGE OF \$100, WHICH PROVIDES YOU WITH THE ACCESS CODES AND LOCAL TELEPHONE NUMBERS TO GAIN ENTRY TO THE SYSTEM, LOCATED NEAR WASHINGTON, D.C. IN ADDITION, THERE IS AN HOURLY FEE FOR THE USE OF THE COMPUTER. ACTUALLY, THE MACHINE COUNTS MINUTES AND ADDS THESE UP TWICE A MONTH AND CONVERTS TO HOURS, THEN BILLS YOUR VISA, ETC. ACCOUNT.

SO WHAT DO YOU GET? FROM THE COMPUTER HOBBYIST STANDPOINT, YOU CAN TALK BASIC, COBOL, OR FORTRAN TO IT. THEY ALSO HAVE THEIR OWN, CALLED INFO U, WHICH IS A DATA-TYPE OF SYSTEM, SUCH AS SETTING UP PAYROLLS, ETC. IF YOU WANT TO KEEP PROGRAMS IN THEIR MACHINE, STORAGE TIME IS AVAILABLE AT ABOUT \$1 FOR 2K PER MONTH.

A SORT OF WORD PROCESSOR IS AVAILABLE - I AM USING IT FOR THIS SEGMENT - WITH CERTAIN EDIT FUNCTIONS, SUCH AS ERROR CORRECTION AND RIGHT MARGIN JUSTIFICATION. I HAVEN'T LOCATED ALL ITS CAPABILITIES YET.

USER-TO-USER COMMUNICATION IS POSSIBLE ON THREE DIFFERENT LEVELS. 1: BROADCAST - A BILLBOARD OR CLASSIFIED AD SECTION IS AVAILABLE, WHERE ANYONE CAN READ YOUR WORDS, LOCATED IN A CATEGORY THAT YOU CAN SELECT (HOUSE FOR SALE, CAR WANTED, SOFTWARE FOR SALE, ETC.) 2: INDIVIDUAL - ONE CAN WRITE MESSAGES, TO SPECIFIC PERSONS. WHEN THEY SIGN IN, THEY WOULD ASK FOR 'MAIL' AND RECEIVE THE MESSAGES THEN. 3: FACE-TO-FACE - TWO PEOPLE CAN MAKE PREARRANGEMENTS TO BE 'UP' AT THE SAME TIME AND COMMUNICATE DIRECTLY WITH EACH OTHER.

DATA BASE - A LARGE VOLUME OF THE COMPUTER MEMORY IS TAKEN UP WITH VARIOUS TYPES OF DATA. FOR EXAMPLE, AIRLINE SCHEDULES, STOCK MARKET QUOTATIONS, NEW YORK TIMES AND UPI REPORTS, JACK ANDERSON'S COLUMN, OVER 600 ITEMS. A SMALL PART OF THE CATALOG IS SHOWN HERE.

Lofton, Louisiana Nc.  
N or S

Lunar Landing (game)-U.

**M**

Magic-DATA MAGIC  
Mail-DATA MAILCALL; MAILCK

Maine News or Sports-UPIS ME  
N or S

Malino, Emily (home decorating)-UPI  
F 1273

Management-NYTCDB(P0078)

Manuals-DATA SYSDOC

Marijuana-NYTCDB(P0079)

Market a Product (game)-PLAY

MARKET

Markov Chain (stat.)-INFO MARKOV

Markov Chain (stat.)-INFO MARKOV

Markov Chain (stat.)-INFO MARKOV

Markov Chain (stat.)-INFO MARKOV

Markov Chain (stat.)-INFO MARKOV

Markov Chain (stat.)-INFO MARKOV

Markov Chain (stat.)-INFO MARKOV

Markov Chain (stat.)-INFO MARKOV

Ma. (038, v)  
Stock Pulse-U.

Trends-UNISTOX (12)

What the Market Did-UNIS (054)

Money Savers-DATA BUCKS;

MONEY

Montana News or Sports-UPIS MT

N or S

Mortgage Analysis-INFO MORGAG

Motion Graphs-INFO LEROC

Movie Reviews-AUTO CINE; UPI F 2790

Moving Plans-DATA TRAVEL; see "Home"; (astrol.) MOVE.

QUEST

POST READ MUSIC;

New Nim (game),

North Dakota Nc.

ND N or S

"Notes on People"-NYTDCB

Notes, Treasury-UNISTOX (

Nuclear Wastes-NYTCDB(P

Numbers-INFO #123

**O** OFF-To sign off SOUR

type OFF in comm

hang up your phor

Ohio News or Sports

Ohm's Law (stat.)-

OHM2

Oklahoma News

N or S

The December issue of KILOBAUD MICROCOMPUTING has a good "how I did it" article on getting up on the SOURCE, p. 180.

A phone call to 1-800-336-3330 will indicate if there is a local telephone number available to you. Communities of less than 50,000 have not yet been provided with such numbers, but this keeps changing.



# ARCADIAN

```

4 .
5 *SURF SOUNDS (1)*          *CRICKETS      (2)*
6 IF &(23)=BGOTO 11
7 IF &(22)=BGOTO 7200
10 CLEAR ;:RETURN ;NT=0;&(21)=0;&(22)=0;&(16)=71;&(17)=0;&(18)=0;&(19)=0;&(20)
=0;GOTO 6
11 FC=245;BOX 0,-20,160,48,3
15 BC=7;&(23)=179;&(18)=150;&(16)=50;&(19)=1
20 BOX RND (160)-88,RND (30)-44,RND (30),1,3;BOX RND (200)-100,RND (28)-44,30,
3,1
30 B=RND (11)-7
40 C=RND (4)-3;IF C=0C=-1
45 G=RND (3)-2;IF G=0G=-1
47 IF H>23G=-(ABS(G))
48 IF H<23G=(ABS(G))
50 P=RND (5)+10
60 FOR Q=1TO P
70 E=E+C;&(22)=E;IF E<35E=35
75 IF E>41E=41
80 D=D+B;&(18)=D;IF D>254D=250
83 IF D<150D=150
100 H=H+G;&(21)=H;IF H<19H=19
106 IF H>30H=30
110 NEXT Q
115 &(19)=RND (3);&(17)=RND (7)
120 GOTO 20
7200 CLEAR
7205 FC=12;BC=0
7210 FOR A=1TO 60
7220 BOX RND (160)-80,RND (88)-44,1,1,1
7230 NEXT A
7240 &(16)=255
7250 &(22)=40;&(21)=15
7260 &(20)=RND (50)+10
7270 &(23)=RND (255)
7280 GOTO 7240

```

Barry Ellerson  
8801 Golf Rd #3F  
Des Plaines, IL 60016

```

2 .
3 .
4 *** CIRCLE PLOTTER
5 CLEAR ;:RETURN ;NT=0
7 BC=0;FC=131
10 INPUT "_Xa"A
11 INPUT "TY""B
12 INPUT "RAD?"R
13 U=1;O=1;P=1;Q=1
15 F=A-R
16 FOR X=FTO F+2bR
17 S=RbR-((X-A)b(X-A));T=Uc4;IF T>Rc8T=U-1
18 FOR U=TT0 500
19 IF (UbU)>SGOTO 21
20 NEXT U
21 U=U-1;IF (S-UbU)<((U+1)b(U+1))-SGOTO 23
22 U=U+1
23 Y=U+B
24 BOX X,Y,O,P,Q;BOX X,Y-(2bU),O,P,Q
25 BOX Y-B+A,X-A+B,O,P,Q
26 BOX Y-B-(2bU)+A,X-A+B,O,P,Q
27 NEXT X
30 CY=40;GOTO 10
110 GOTO 10

```

```

1 .
2 .
3 . GRANDFATHER CLOCK
4 : RETURN ; CLEAR ; NT=0; &(0)=0; &(1)=0; BC=0; &(2)=131; &(3)=131; FC=234; &(9)=20; A=
0; P=115
5 PRINT "SET TIME"; INPUT "HR"H; INPUT "MIN"M; PRINT "#1 TO RUN
6 IF &(23)=8 GOTO 8
7 GOTO 6
8 CLEAR
9 CX=-17; CY=37; PRINT "11"; CY=39; CX=-3; PRINT "12"; CY=37; CX=14; PRINT "1
10 CX=-23; PRINT "10"; CX=20; PRINT "2"; CX=-24; PRINT "9"; CX=25; PRINT "3
11 CX=-19; PRINT "8"; CX=20; PRINT "4"; CX=-13; PRINT "7"; CX=14; PRINT "5"; CX=0; CY
=4; PRINT "6
12 BOX 0,22,60,44,3; BOX 0,22,58,42,3; BOX 0,-22,41,44,1; BOX 0,-22,31,40,3
13 BOX -35,-39,32,10,1; BOX 35,-39,32,10,1
14 @ (1)=42; @ (2)=53; @ (3)=47; @ (4)=71; @ (5)=71; @ (6)=47; @ (7)=42; @ (8)=53; @ (9)=42; @ (1
0)=47; @ (11)=53; @ (12)=71
15 @ (13)=71; @ (14)=42; @ (15)=47; @ (16)=53; GOTO 310
20 LINE 0,0,4; LINE 10,-30,2; LINE 0,0,2; BOX 10,-33,5,5,2; LINE -10,-30,1; BOX -10
,-33,5,5,1; RETURN
21 LINE 0,0,4; LINE -10,-30,2; LINE 0,0,2; BOX -10,-33,5,5,2; LINE 10,-30,1; BOX 10
,-33,5,5,1; RETURN
25 &(22)=0; &(19)=57; &(16)=0; &(17)=18; &(18)=2; &(22)=188; &(21)=207; &(18)=58
26 FOR B=1 TO 11; &(22)=-16B+61; &(21)=-16B+207; NEXT B
27 &(21)=195; &(17)=0; &(21)=194; &(22)=40; &(21)=193; RETURN
29 U=0
30 FOR G=2 TO A
31 U=U+1
35 S=S+1; Q=Sc2; GOSUB RM+20; GOSUB 25; I=Uc4; IF RM=0P=40; GOTO 100
37 GOTO 101
40 NEXT G
44 IF R#75P=115; GOTO 100
45 P=70
50 FOR G=1 TO H
55 S=S+1; Q=Sc2; U=17; @ (U)=66; GOSUB RM+20; GOSUB 25
60 GOTO 100
70 NEXT G
80 P=115
100 &(21)=0; &(22)=0; &(16)=71; &(17)=8; &(19)=0
101 S=S+1
103 Q=Sc2; GOSUB RM+20
105 IF S>59S=0
106 CX=30; PRINT #3, S, " "
110 &(18)=(RM+3)65; &(23)=28; &(21)=213; &(22)=51; &(21)=0; &(22)=0
112 IF S=0 GOTO 200
114 T=80; GOTO P
115 FOR Z=1 TO T; NEXT Z
116 GOTO 101
200 M=M+1; IF M=60M=0; GOTO 300
210 CX=-30; IF M<10PRINT "0", #0, M,
220 IF M>9PRINT #0, M,
225 R=15; IF M=0R=75
226 A=(M+R)c15; IF RM=0S=S+(Ab2); GOTO 29
230 P=115; GOTO 100
300 H=H+1; IF H=13H=1
310 CX=-48; CY=-39; IF H<10PRINT " ",
320 PRINT #0, H, ; CX=-36; PRINT ":",
330 GOTO 210

```

Barry Ellerson  
8801 Golf Rd #2F  
Des Plaines, IL 60016

1 .COLOR CHART

2 .

3 .BY JIM WINN

4 .

5 E=480;F=1250

10 CLEAR ;BC=0;FC=7;C=0;NT=0

20 PRINT " 0=BLACK 7=WHITE

90=RED

205=CYAN

172=GREEN

3=MAGENTA

30 PRINT " 249=BLUE 126=YELLOW

70 NT=3;CX=-60;CY=-20;PRINT "SELECT YOUR COLOR ?";NT=0

80 K=KN(1)C30

85 CX=-42;CY=-30

90 IF K=-4GOSUB 400

100 IF K=-3GOSUB 410

110 IF K=-2GOSUB 420

120 IF K=-1GOSUB 430

130 IF K=1GOSUB 440

140 IF K=2GOSUB 450

150 IF K=3GOSUB 460

160 IF K=4GOSUB 470

170 IF TR(1)GOTO 190

180 GOTO 80

190 CLEAR ;IF (A=0)+(A=7)+(A=43)+(A=90)+(A=126)+(A=172)+(A=205)+(A=249)C=C+A

200 C=C+JY(1)

210 IF JY(1)CLEAR

220 IF C>255 C=255

230 IF C<0 C=0

240 BC=C;FC=BC+12

245 IF JY(1)=0CX=-35;CY=0;PRINT C

250 IF JX(1)=1GOTO 10

255 IF JX(1)=-1 GOTO 800

280 GOTO 200

400 A=0;PRINT A;GOTO E

410 A=90;PRINT A;GOTO E

420 A=172;PRINT A;GOTO E

430 A=249;PRINT A;GOTO E

440 A=7;PRINT A;GOTO E

450 A=205;PRINT A;GOTO E

460 A=43;PRINT A;GOTO E

470 A=126;PRINT A;GOTO E

480 RETURN

800 CLEAR ;&(9)=84

810 &(0)=C;&(1)=C;B=C

820 C=0;BC=0;FC=7;NT=0

830 PRINT " 0=BLACK

840 PRINT " 7=WHITE

850 PRINT " 90=RED

860 PRINT " 172=GREEN

870 PRINT " 249=BLUE";NT=3

880 CY=-20;PRINT "SELECT COLOR";NT=0

890 K=KN(1)C50+2

895 CY=-30

900 IF K=0GOSUB 1200

910 IF K=1GOSUB 1210

920 IF K=2GOSUB 1220

930 IF K=3GOSUB 1230

940 IF K=4GOSUB 1240

950 IF TR(1)GOTO 970

960 GOTO 890

970 CLEAR ;IF (A=0)+(A=7)+(A=90)+(A=172)+(A=249)C=C+A

980 C=C+JY(1)

985 IF JY(1)CLEAR

990 IF C>255 C=255

1000 IF C<0 C=0

1010 NT=0;BC=C;FC=B

1015 IF JY(1)=0CY=0;PRINT C;CX=3;CY=0;PRINT B

1020 IF JX(1)=1&(9)=50;GOTO 10

1025 IF JX(1)=-1CLEAR ;GOTO 820

1030 IF TR(1)=0GOTO 980

Jim Winn

Box 98

Boiling Springs, NC

28017

1040 BOX -40,20,40,20,1;BOX -40,-25,30,1,1;BOX -40,-25,1,30,1

1050 &(2)=C;&(3)=C

1060 BOX 40,20,20,40,2,1;BOX 40,-25,30,1,1;BOX 40,-25,1,30,1

1070 GOTO 980

1200 A=0;PRINT A;GOTO F

1210 A=7;PRINT A;GOTO F

1220 A=90;PRINT A;GOTO F

1230 A=172;PRINT A;GOTO F

1240 A=249;PRINT A;GOTO F

1250 RETURN

Once you have this utility program on your tapes, you will be able to make a good assessment as to the colors to be used in a particular program you are developing. It starts out by asking for a general color area, and then it will step through the hues (using the joystick). When you find one you like, moving the joystick to the left will cause the screen to split, and you can make your second choice on the left side. In this way you can easily see how the colors will look. And as you do this, the color numbers appear to identify them.

MORE BLUE RAM BASIC. Since the last ARCADIAN was published, considerable progress has been made toward loading and running BASIC programs in the Blue Ram. Two separate approaches have been pursued, each with its own advantages and trade-offs. The first approach is along the line described briefly in the last ARCADIAN where CALLs are made to BASIC segments which are essentially line-extensions to the line containing the CALL. Line numbers as such are not used and special linkages are required to access a segment. (See ARCADIAN pages 15 and 16) An editor to assist in the entering and dumping of a Blue Ram BASIC program part is being sent free of charge to all Blue Ram owners in the form of a letter from Perkins Engineering. The letter contains a series of short programs to aid in writing and entering Blue Ram BASIC programs. The advantage of this programming approach is that the total program size can exceed 6000 slightly. Its trade-off is in the careful planning required to plan and debug program segments in advance of entering them.

The second approach is a "Cadillac" compared to the "bicycle" first approach. While the "bicycle" is more efficient in terms of available memory space for programs, the "Cadillac" has all the comforts of home. Just enter program lines into the Blue Ram as you would in normal memory. The procedure is as follows:

1. Load the Blue Ram Operating System. The Blue Ram Operating System (1.0) is available on tape for \$9.95 and provides the high-level linkages and support routines necessary to program both the normal and Blue Ram memory in a straight-forward, compatible way.

2. Enter normal memory program lines as usual with line numbers followed by program statements. At the end of the normal memory segment, enter either a STOP statement to end processing, or a GOSUB nnn\* statement to continue processing in the Blue Ram memory.

3. Perform a CALL24576 statement (without a line number) to inform the Operating System that the following lines are to be entered into Blue Ram memory. The Operating System will respond with a BR> prompt. All program lines entered under the BR> prompt will be stored in Blue Ram memory. Use line numbers in the normal way except that Blue Ram line numbers must be higher than normal memory line numbers. Press GO without any statement to return to normal memory (and the normal> prompt). Lines may be entered or deleted at will in both memories and automatic line sorting occurs in both memories also. While in the Blue Ram mode (BR> prompt), the LIST statement will list the program lines entered into the Blue Ram. PRINT RM will display the remaining program memory available in the Blue Ram similar to the way PRINT SZ displays the remaining available normal program memory.

4. Enter an RPLnnn/xxx/yyyy statement to edit a portion of an existing line. RPL is a new command interpreted by the Operating System. nnn is any existing line number in either memory. / is a delimiter which may be any symbol not in the subject text. Which ever symbol is chosen must be used in both places in the statement. xxx is any text segment in the existing line (including the line number) which is to be replaced by the new text segment yyyy. Only the first occurrence of the existing text segment will be replaced. The old and new text segments need not be the same length and lack of a new segment is taken as a simple delete.

5. Program transfers to subroutines in Blue Ram memory are via GOSUB nnnn statements, where nnnn is the line number of the beginning of the subroutine. Variations of this statement are:

- |              |  |
|--------------|--|
| GOSUB nnnn   | Performs a subroutine call in the normal way to both normal and Blue Ram memory.   |
| GOSUB nnnn*  | Equivalent to a GOTO nnnn when accessing Blue Ram memory. Illegal for normal memory.   |
| GOSUB nnnn** | Equivalent to a return from the current Blue Ram subroutine followed by a GOTO nnnn. This statement acts as an abnormal exit from a subroutine and is illegal for normal memory. |

The GOSUB statement as applied to Blue Ram line numbers has been expanded in format to include parameter passing in the same statement. For example: GOSUB 3400,23,Q+N-5,"TEXT XXX";... is equivalent to: A=23;B=Q+N-5;C=(text address);GOSUB 3400. Each parameter following the object line number is automatically transferred to the letter variables beginning with A. Where a text string is a parameter, the memory address of the string is passed as the parameter. The called subroutine can then access the text string using the %(n) form. For example:

```

1200 GOSUB 5000,"DATE",D
:
:
5000 PRINT "ILLEGAL ",;FOR A=A TO A+15;C=%(A)+256;TV=RM
5010 IF C#34 NEXT A
5020 PRINT " ",B

```

Running line 1200 would print the following: ILLEGAL DATE 219 assuming, of course, D had the value 219 in it. The parameter passing can be used in conjunction with the asterisks to form some very versatile subroutines and other program segments.

THE BLUE RAM COMMUNICATIONS INTERFACE will be available January 15 for connection of the Blue Ram with keyboard to a Livermore STAR modem for communications with other ARCADIANs and other computers. The basic kit is \$69.95 including all parts, program tape, and documentation. An optional port for the BASE2 800B printer is also available for \$10.00. This printer can be bought for about \$600.00 and features a programmable font and graphics. The programmable font allows the use of the Bally character set including multiply and divide signs and the graphics allows the printing of what is on the screen (literally). The interface is also available wired and tested for \$99.95 including the printer port. A special package price of \$299.95 includes the interface kit, a STAR modem, a special Source communications software package, and membership in the Source. This package represents a \$50.00 savings and is available only to ARCADIANs. The special Source communications package features a smaller character set allowing 40 characters on a line and 14 lines of text. Other features include: Auto carriage return to prevent lost mail text, auto CNTL-S - CNTL-Q to hold one page of text until it is read, bell character, send and receive characters in different colors, and more...all tailored to the protocol of the Source. By itself this program is \$19.95.

I can supply the BASE 2 printer at \$600., and a membership in The SOURCE at \$100. California residents add tax to these and the above prices.

# ARCADIAN

## CASSETTE REVIEW

Date: 8/30/80

CASSETTE NAME: Program Tape #1  
 PROGRAMS ON CASSETTE: Space Battle 9.0; Bombardment 2.0; Bullsseye 2.0;  
 Startrek III 11.2; Chase III 1.0

CASSETTE PRICE: \$10.00 LISTING PRICE: Not Available  
 SOURCE Name: Mark Keller  
 Address: 9536 Shumway Drive  
 City: Orangevale State: CA ZIP: 95662

Reviewed by B111 Rueger Age 31

PROGRAM NAME: Space Battle 9.0  
 DESCRIPTION: You must shoot down the UFO. You have a limited amount of time and ammo in which to get the UFO into your gunsight and fire. The UFO becomes more elusive as your aim gets better. Unfortunately, this game is very similar to others and not as sophisticated.

RATING % based on applicable rating items. 41/72 = 56.9%  
 PD= 8 PP= 5 USF= 5 LC= 5 OC= 5 LI= 4 EV= XX EU= 5 OV= 4  
 Time to play 5 min. For ages All # of players 1

PROGRAM NAME: Bombardment  
 DESCRIPTION: A grid of numbers is presented and you must pick out four of them as your "forts". The computer also has a similar grid and it picks out four also. You alternate with the computer in trying to guess which locations are chosen by use of the hand controller. The first one to guess them all is the winner. Not a very exciting game and tiring after a few rounds.

RATING % based on applicable rating items. 44/72 = 61.1%  
 PD= 7 PP= 7 USF= 6 LC= 4 OC= 5 LI= 3 EV= XX EU= 7 OV= 5  
 Time to play 3 min. For ages All # of players 1

PROGRAM NAME: Bullsseye  
 DESCRIPTION: A dart game. No graphics, but a choice of three "throws", each with a different set of odds. It allows for up to 20 players to play, but unfortunately, it is not a very exciting game.

RATING % based on applicable rating items. 53/72 = 73.6%  
 PD= 8 PP= 7 USF= 7 LC= 6 OC= 6 LI= 6 EV= XX EU= 7 OV= 6  
 Time to play 5 min. For ages all # of players 1 to 20

PROGRAM NAME: Star Trek III  
 DESCRIPTION: THE BEST THERE IS!! This is a real time version. It incorporates ALL the features of the 16K-plus versions. Klingons actually move in the Quadrant you are in. When moving, they can utilize a "cloaking device" which make them temporarily invisible. When you fire a phasor or a photon torpedo, you see it move on the screen. Five commands are available including direction and energy unit designations. You travel in a 9x9 universe. This is definitely the best Star Trek available for the BALLY. It's really ingenious how so much can be crammed into 1.8K. If you're into Startrek, this is the one for you. Worth the price of the Tape alone!

RATING % based on applicable rating items. 71/72 = 98.6%  
 PD= 3 PP= 9 USF= 9 LC= 9 OC= 9 LI= 9 EV= XX EU= 9 OV= 9  
 Time to play 30-60 min. For ages All # of players 1

PROGRAM NAME: Chase  
 DESCRIPTION: Robots are out to get you. Similar to "BOTS" already published in the ARCADIAN, but you are able to pick the number of robots and also the number of walls. The playing field is also larger. This is a challenging and fun game.

RATING % based on applicable rating items. 59/72 = 81.9%  
 PD= 8 PP= 8 USF= 8 LC= 7 OC= 6 LI= 7 EV= XX EU= 7 OV= 7  
 Time to play 5 min. For ages All # of players 1

# ARCADIAN

```

2 .
3 .
4 .ALCHEMISYMMETRICAL          ART
5 CLEAR ::RETURN :NT=0;&(10)=173;GOTO 20
10 FOR N=1TO G
11 X=X+(HbQ);Y=Y+(IbR);A=A+(JbS);B=B+(KbT);U=A-(JbS);V=B-(KbT);LINE U,V,4;LINE
X,Y,F;LINE A,B,E
12 LINE -U,-V,4;LINE -X,-Y,F;LINE -A,-B,E;LINE -U,V,4;LINE -X,Y,F;LINE -A,B,E;
LINE U,-V,4;LINE X,-Y,F;LINE A,-B,E;NEXT N
20 L=RND (3)+15;BC=RND (32)b8+RND (3)-1;FC=BC+RND (32)b8+RND (4)+1;C=RND (5)-3
:M=M+1;IF C=0C=2
30 O=BC+RND (32)b8;P=FC+RND (32)b8;&(0)=0;&(1)=0;&(2)=P;&(3)=P;IF M>1BC=2;M=0;
FC=RND (32)b8+(2bC)+2;&(9)=50;GOTO 50
40 GOSUB L+25;GOTO 50
41 &(9)=148;RETURN
42 &(9)=20;RETURN
43 &(9)=20;&(0)=BC;&(1)=BC;RETURN
50 Q=RND (5)-1;R=RND (5)-1;S=RND (5)-1;T=RND (5)-1
60 G=RND (20)+5;F=RND (4);E=RND (4);IF F=4F=1
70 H=RND (3)-2;J=RND (3)-2;K=RND (3)-2;IF E=4E=2
80 I=RND (3)-2;IF E>1IF F=3F=2
90 IF (ABS(A))-X>50A=0;BC=144;&(0)=144;&(1)=144;FC=RND (32)b8+RND (4)+1
100 IF (ABS(X))-A>50X=0;BC=129;&(0)=129;&(1)=129;FC=RND (32)b8+RND (4)+1
110 IF (ABS(B))-Y>30B=0;BC=224;&(0)=224;&(1)=224;FC=RND (32)b8+RND (4)+1
120 IF (ABS(Y))-B>30B=0;BC=0;&(0)=0;&(1)=0;FC=RND (32)b8+RND (4)+1
130 IF (ABS (GbIbR+Y))>39GOTO 50
140 IF (ABS (GbKbT+B))>35GOTO 50
150 IF (ABS (GbJbS+A))>79GOTO 50
160 IF (ABS (GbHbQ+X))>72GOTO 50
170 GOTO 10

```

Barry Ellerson  
8801 Golf Rd. #3F  
Des Plaines, IL 60016

## MEMORY EXPANSION

A motherboard/bus system is one in which a printed circuit board (motherboard) contains a number of connectors that are wired in parallel. Option items are contained on "cards" which plug into any of the connectors. To tell the computer which option you want, you have to give it some sort of address, such as "USE SLOT 3". We now have the first multi-option expandable bus system in the final stages of production, and next month's issue will have the details. The basis for this new system is a metal cabinet with a 5-slot motherboard, a bus cable connector, fuze protected power supply, and on/off switch with indicator lamp. Once you have purchased this unit, you can buy any or all of the below options - when plugged in they are ready to go.

### Options to be available next month will be:

1. 16K memory board.
2. High speed cassette interface at 2400 baud with dual cassette capacity.
3. Additional 5-slot bus expansion unit.
4. 2K EPROM board with 1K operating system monitor included. Allows keyboard and tape input without Bally BASIC language.
5. 53 key ASCII encoded keyboard with cable and connector.

Alternative Engineering, having some problems with mail delivery at the 1 Gilbert Drive address, have moved to a postal box- P.O. Box 128, Gardiner, ME. 04345. I have been using their power supply (\$25, see ad p 106) for some time now and am well pleased with it. Really heavy duty, professional in appearance, and runs cool.

#### AES:

- For Sale: Computer Ear-Complete with software & instruction manual \$45.  
Mike Maslowski, 9 Arthur Ave. Clarendon Hills, IL 60514 312/654-8937
- Hard Controllers Repaired; Bill Mead, 7531 Chile, Buena Park CA 90620

#### BALLY/ASTROVISION SOFTWARE and HARDWARE SOURCEBOOK

Included in this Sourcebook are descriptions and source information on over 230 Software and Hardware Items. The Software is indexed by Program Name, Type of Program and Program Source. The Hardware is indexed by Hardware Item, Hardware Classification, and Hardware Source. This Sourcebook of 58+ pages is available for \$ 5.00 from Richard M. Houser  
635 Los Alamos Ave.  
Livermore, CA 94550

\* Software from Steve Walters, 556 Langfield, Northville, MI 48167 (313)349-1083  
Each listing \$2.00; all four listings for \$5.00, or with tape for \$10.00.

- (1) MEMORY MAZE: study the maze, then try to move thru it while it is invisible. Program generates new maze each game. For 1 or 2 players, 3 levels of difficulty, scoring, sound effects and music.
- (2) BLACK BOX: find 5 balls hidden in the box by sending probes into the box and seeing where they come out. Like the Parker Brothers game but with full hand-control operation and screen feed-back (no notes to keep while playing). Scoring, 1 to 4 players, sound effects.
- (3) CRAZYFACE: Bally draws a cartoon Chinaman, football player, witch, singe and mountie. Then Crazyface lets you mix the hats, eyes, noses, mouths and necks to create your own crazy faces.
- (4) HIDDEN WORD FINDER: manipulates a hidden word ouzzle (like the ones from school that your kid asks you to find the one last word in!) so that the hidden words can be easily spotted. You may even find words that the puzzle designer didn't notice!

USER GROUP CORNER The Chicago Area Users Club has settled on monthly meetings, the third Sunday of each month at the de Vry Technical Institute, 3300 North Campbell, Chicago. Call Mike Maslowski, 312-654-8937. Late notes from them indicate interesting guests coming up in January (AstroVision representative) and February (Jay Fenton, Bally programmer)

In the Milwaukee area, Doug Alexander, 2911 Parkshire Dr, Racine; 414-886-5973 would like to communicate with local subscribers.

In the Long Island area, Bill Rueger, 336 Beach 38th St., Far Rockaway would be interested in getting together with locals.

#### NEW BASIC LANGUAGES

1. Astro Vision is planning an updating of the Bally BASIC which will primarily allow data transfer at a 2000 baud rate, about 7 times faster than now possible, to and from tape. This will probably require a pretty good tape recorder to handle the high rate. There will be little change in the BASIC language itself.

2. Extended BASIC, first mentioned on p. 78 of Vol. 2, is close to completion. Delays have resulted from our attempts to make the unit compatible with both the Blue Ram and the Alternative Engineering expansion mentioned on p.39. This technique is pretty unusual in the microcomputer business where incompatibility is the norm. The BASIC will be contained in 8K.

#### ARCADIAN

40

Robert Fabris, CES observer  
The SOURCE TCD 959  
3626 Morrie Dr.  
San Jose, CA 95127

**FIRST CLASS**



ASTROVISION APP-CV is called "ZGRASS-32 COMPUTER KEYBOARD", and was shown at the Consumer Electronic Show at Las Vegas a month ago. The box, layout of parts, etc., is essentially the same as the one shown by Bally and illustrated on p. 29 of Vol 1. The shown sample was all black, and had an arcade unit resting on its upper surface. What's inside? The following data is taken from a publicity sheet handed out: 32K more RAM, 24K more ROM, the keyboard, and the ZGRASS language. Cost?-\$599. Delivery?-well...I heard 'manufacturing in June' twice, so we'll see. More details...

Language used is Dr. DeFanti's ZGRASS, a graphics-oriented BASIC. A description of the language and its unique commands are contained in Vol 1, pages 11 - 14, and 37. The ZGRASS is contained in the 24K ROM, along with a 'scientific math system'. It gives four colors anywhere on the screen, which is configured at 160x100 pixels. The prime direction for ZGRASS is for the development of graphically exciting programs, whether they be games, video art, pie charts, or whatever. The beginnings were included in the basic arcade unit, with the commands LINE and BOX. New commands will be POINT and CIRCLE. Arrays will be multi-dimensional. There will be interpreted and compiled modes. The extended math package is floating point with trig & log (e and 10) functions, and square root.

PLANNED EXPANSIONS to the keyboard unit include:

32K more RAM

TV PRINTER - hard copy of what is on the TV screen ( a scan is made of the screen and a print made of it.)

LIGHT PEN

BIT PAD DIGITIZER - a worksheet is electrically attached to the computer and a wand is touched to the pad. A dot appears on the screen at the same relative point. Drawings can be transcribed to the screen(=computer) and the coordinates of all the points are now in memory

DUAL CASSETTE CONTROL at 1800 baud, motor of cassette is computer-controlled.

DISC STORAGE - a connector is included.

SLIDE COPIER

SOUND SYSTEM - connection to audio amplifier input

More details on the above as they are discovered. One of the reasons for the CES was contact with dealers/distributors, to show the line, and sign up as their plan dictates. Quite a bit has to be regenerated from the old Bally days, as well as expansion beyond those levels to get nation-wide coverage. Regardless, if you are not able to find one in your area (after June,etc.) let me know and we'll handle it by mail order.

NEW GAME VIDEOCADES: Here is the lineup of the first batch - which are now scheduled for March

2011 GALACTIC INVASION / 2012 SPACE FORTRESS / 2014 GRAND PRIX-DEMOLITION DERBY / 4003 MUSIC MAKER 1 / 4004 BIORHYTHM

USER GROUP REPORT The CACHE group indicate that they now have a file of 50 programs in their software library. A reference library of printed material (hardware-oriented) is also being set up for the group. It was reported that REX TV has opened a new Bally service center at 18666 S. Dixie Highway, Homewood, IL 779-7800

LISTED PROGRAMS have a number of small letters in them, because my CCMPRINT does not have some characters. Therefore, you have to make a little conversion, as follows: a = right arrow > b = multiply \* c = divide +

AN EXCELLENT TUTORIAL on Machine Language programming - getting some of the basics down - was printed in the November Kilobaud MICROCOMPUTING, p.70. I'd say it was a medium-level description that taught me quite a lot and will be used as a reference in later operations. It explains some of the descriptive codes used (like 8B CA etc). While the article specifically deals with the 6802 processor, the ideas as well as some specifics also fit the Z80.

BLUE RAM OPERATING SYSTEM (1.0) arrived the other day, and it has two very useful features: 1. It allows EDITING of line statements, using a new RPL command (RePlace). You can either fix a line by adding, deleting, or changing something in the line, or you can change the line number from one value to another. People send in programs on tape, and sometimes the transfer to the Bally is not correct (usually a long line) and making the correction is a pain. But now I've used the 1.0 system, and I can easily make the necessary change. Especially since I've loaded the keyboard routine as well. All one needs to do is enter RPL (line number)/(old word)/(new word) RETURN or GO, and its done. 2. It allows the storage of 3800 Bally BASIC bytes in the Blue Ram. ((NOT machine language, but good ol' BB)) This opens up the world to those of you who aren't too keen on machine language, because all you have to do is follow a few simple rules, and keep writing programs in BB. In essence, there is a divider built in, all program lines below 1999 go into the old Basic storage areas, while material in line numbers above 1999 go into the BR. One can shift back and forth between the two areas. So now there are 5600 bytes available - lets see some programs that take advantage of that space.

ALTERNATIVE ENGINEERING is proceeding with the design and construction of the motherboard memory addition. They report that a small rearrangement has taken place, in that some previous options are now included in the basic package, resulting in about a month's delay. The prime package will include a power supply capable of handling all accessories, p.c. board and connectors, some onboard intelligence to control things, plus some other goodies. The two prime accessories will be the memory package and the keyboard package. Other units are also under consideration. Full details are due in the announcement which I plan to have in the next issue.

EXTENDED BASIC language is moving along smartly - current plans are to provide both tape and ROM versions so you can choose the format that suits you best. A little preview of the new commands follows:

CIRCLE / POINT / NEW (erases program) / DATA (provides initialization of variables in a shorter manner) / ZERO (sets all variables to zero)  
In addition to the usual FC and EC, two more foreground colors are available in FA and FB.

There are commands available for storing and retrieving programs, or just bits of programs.

Two windows can be generated on the screen, and their size limits controlled, for both graphics and characters.

How about a 3x5 character set available at CF=SMALL?

And it will automatically convert to a hex number base with the ! character. SCROLL will roll the screen up or down a specified number of lines.

➤ in front of a variable will give its memory location.

That ought to whet your appetite - we'll have more information as it becomes available, including delivery and cost, in subsequent issues.

The following tutorial was written by Bob Wiseman, and details some of his programming 'tricks', explaining why.

## PART I. HOW TO KEEP IT SMALL.

WHEN YOU PROGRAM THE ARCADE, YOU HAVE A GRAND TOTAL OF 1.8K OF USER MEMORY AVAILABLE FOR PROGRAM AND STRING DATA. THIS IS SELDOM ENOUGH. WHENEVER I PROGRAM THE ARCADE, I WRITE THE PROGRAM ON PAPER FIRST. THIS ALLOWS ME TO CALCULATE MEMORY REQUIREMENTS EARLY SO THAT I CAN HEAD 'EM OFF AT THE PASS. I STRUCTURE THE PROGRAM INTO MODULES WHENEVER POSSIBLE. I WRITE EACH MODULE ON A SEPARATE SHEET SO THAT I CAN REWRITE A SINGLE MODULE WITHOUT AFFECTING ANYTHING ELSE. HAVING A PENCIL COPY OF A PROGRAM IS AN INVALUABLE AID WHEN SEARCHING FOR THAT ELUSIVE BUG.

SO, I WRITE THE PROGRAM ON PAPER, AND THEN I ADDUP THE MEMORY NEEDED. I HAVE 1800 BYTES TO START WITH.

### COUNT THE FOLLOWING:

- 3 BYTES PER LINE FOR STORAGE FOR THE LINE NUMBER AND CARRAGE RETURN.
- 1 BYTE PER KEYWORD. THE WORDS PRINT, LIST, GOTO, LINE, FOR, TO, NEXT, STEP, GOSUB, RETURN, BOX, INPUT IF, AND RND ALL TAKE ONE BYTE.
- 1 BYTE PER PUNCTUATION. THESE SPECIAL CHARACTERS TAKE ONE BYTE: COMMA, PERIOD, QUOTE, EXCLAMATION, PARANTHESIS, EQUALS, POUND SIGN, ETC..
- 1 BYTE PER ALPHABETIC LETTER. EACH LETTER, WHETHER USED AS A VARIABLE OR USED IN QUOTES, COUNTS 1 BYTE. ITEMS LIKE CX, BC, AND NT HAVE TWO LETTERS AND SO THEY COUNT TWO BYTES. SPACE COUNTS ONE BYTE.
- 1 BYTE FOR EACH NUMERIC SYMBOL NOT BEGINNING A LINE.

### HERE ARE SOME EXAMPLES:

```
10 GOTO 10           (COUNTS 6 BYTES)
20 PRINT "ABC"       (COUNTS 8 BYTES)
300 IF A=RND (3)GOTO 400 (COUNTS 14 BYTES)
```

IN ADDITION TO THE MEMORY USED IN YOUR PROGRAM, YOU MAY NEED TO PROVIDE SPACE FOR STRINGS OF DATA. I AM REFERRING TO THE USE OF THE AT-SIGN TABLE TO STORE DATA. EACH TAKES TWO BYTES. SO IF YOU USE @ (0), @ (1), ... , @ (9), THEN YOUR PROGRAM MUST LEAVE TWENTY BYTES FREE.

### THE FOLLOWING SHORT PROGRAM:

```
10 FOR A=0T09:@(A)=0:NEXTA
```

WILL TAKE 19 BYTES TO STORE, AND AN ADDITIONAL TWENTY BYTES WHEN IT IS RUN FOR STORAGE OF THE DATA.

NOW THAT WE KNOW WHERE THE MEMORY GOES, WE SHOULD BE ABLE TO USE IT MORE EFFICIENTLY. THESE GENERAL RULES MAY HELP.

- 1) COMBINING SHORT LINES TOGETHER HELPS REDUCE THE THREE BYTES PER LINE OVERHEAD.
- 2) ELIMINATE UNNECESSARY SPACES. THE ONLY TIME THAT A SPACE IS REQUIRED BY BALLY BASIC IS TO SEPARATE TWO VARIABLES. FOR EXAMPLE:  
     10 IF A=CGOTO 10     (NO SPACES REQUIRED)  
     20 IF B=D E=F     (SPACE REQUIRED TO SEPARATE D AND E)
- 3) USE VARIABLES TO REPLACE OFTEN USED, LONG NUMERIC VALUES. THIS CAN BE ESPECIALLY VALUABLE FOR LINE NUMBERS. EACH TIME YOU USE THE NUMERIC VALUE 3210 (FOR EXAMPLE), YOUR PROGRAM IS FOUR BYTES LARGER. IF YOU SAY "T=3210" THAT COSTS SIX BYTES. IF YOU NEED TO REFER TO 3210 MORE THAN TWICE (AND YOU HAVE AN AVAILABLE VARIABLE OF COURSE) YOU CAN SAVE MEMORY.

EXAMPLE:

10 IF A=3210B=B+1	5 T=3210
20 IF B=3210C=C+1	10 IFA=TB=B+1
30 IF C=3210GOTO10	20 IFB=TC=C+1
	30 IF C=TGOTO10

THE PROGRAM ON THE LEFT TAKES  $15+15+13=43$  BYTES. THE ONE ON THE RIGHT TAKES  $9+12+12+10=43$  BYTES. THE ONE ON THE RIGHT RUNS FASTER. IF WE HAD PUT "T=3210" ON LINE 10, THEN THE RIGHTHAND PROGRAM WOULD BE SMALLER ALSO.

- 4) OMIT TRAILING QUOTATION MARKS. LINE TEN AND TWENTY WILL PRINT THE SAME THING.

EXAMPLE:

```
10 PRINT "ABCDEF"
20 PRINT "ABCDEF"
```

- 5) DO NOT BE AFRAID TO RE-WRITE. FIRST, YOU WRITE WHAT WORKS. NEXT, YOU WRITE WHAT WORKS BETTER. FINALLY, YOU WRITE IT SMALLER.

EXAMPLE: SUPPOSE WE HAVE REACHED A POINT IN THE PROGRAM WHERE WE HAVE A ZERO OR A ONE IN VARIABLE "A". IF ONE, WE WANT TO CHANGE "A" TO A ZERO. IF ZERO, WE WANT TO CHANGE "A" TO A ONE. SO WE FIRST WRITE THE OBVIOUS:

```
100 IF A=0A=1:GOTO120
110 A=0
120 ...CONTINUE
```

THIS WORKS AND IT TAKES  $15+6=21$  BYTES. FURTHER HEADSCRATCHING AND THE MEMORY BULB LIGHTS UP:

```
100 A=1-A
```

THIS TAKES A MERE 8 BYTES AND DOES THE SAME THING.

I HAVE OFTEN DISCOVERED THAT FINDING A SIMPLE ALGEBRAIC FORMULA WILL SAVE MANY BYTES. THE DIFFICULT PART IS FINDING THE FORMULA.

- 6) USE SUBROUTINES WHENEVER POSSIBLE. ANYTHING THAT YOUR PROGRAM DOES MORE THAN ONCE SHOULD BE IN A SUBROUTINE. WHEN YOU BREAK UP A PROGRAM INTO SUBROUTINES IT BECOMES EASIER TO DEBUG BECAUSE THE SUBROUTINES CAN BE TESTED INDEPENDENT OF THE REST OF THE PROGRAM. DRAWING A SHORT FLOWCHART (HORRORS!) BEFORE BEGINNING CODING IN BASIC WILL HELP ORGANIZE YOUR THOUGHTS ABOUT WHAT SHOULD BE A SUBROUTINE. SUBROUTINES HELP AVOID REDUNDANT CODE, AND THIS KEEPS IT SMALL.

---

## PART II. MAKING IT RUN FASTER.

---

THE BEST TIME TO MAKE A PROGRAM RUN FASTER IS BEFORE YOU HAVE WRITTEN IT. AFTERWARDS, THE CHANGES MAY BE TOO DIFFICULT TO MAKE AND DEBUG (SORT OF LIKE ADDING AN EXTRA BATHROOM ON THE SECOND FLOOR AFTER THE HOUSE HAS BEEN BUILT). THE GENERAL RULE I HAVE FOLLOWED IS:

(OTHER THINGS BEING EQUAL) THE FEWER BYTES BASIC HAS TO INTERPRET THE FASTER THE PROGRAM RUNS.

THIS EQUATES TO PART I. IN GENERAL, THE SHORTER A PROGRAM, THE FASTER IT RUNS. I HAVE RUN A FEW SHORT TIMINGS AND THEY SEEM TO FOLLOW THIS RULE. REMEMBER OUR EXAMPLE WHERE WE REPLACED THE VALUE 3210 WITH THE VARIABLE "T". THE EXAMPLE ON THE RIGHT RUNS FASTER BECAUSE BASIC HAS FEWER BYTES TO INTERPRET.

HERE IS AN EXPERIMENT FOR YOU TO PERFORM. WRITE THE BASE PROGRAM AS FOLLOWS:

```
10 FOR A=0 TO 3000
20 NEXT A
```

RUN THIS AND TIME ITS EXECUTION WITH A WATCH. RECORD THIS TIME. NOW TRY INSERTING DIFFERENT LINES INTO THE CENTER AND SEE HOW THIS AFFECTS THE TOTAL RUN TIME. I FOUND THIS TO BE QUITE INTERESTING. IF NO GRAPHICS ARE INVOLVED, I FOUND THAT THE EXTRA EXECUTION TIME WAS ALMOST DIRECTLY PROPORTIONAL TO THE EXTRA NUMBER OF BYTES INTERPRETED. USE EACH OF THE FOLLOWING AND SEE HOW THEIR TIMES COMPARE.

```
20 B=A           (6 BYTES)
20 B=12345+1     (12 BYTES)
```

I FIND THAT BOX AND LINE REQUIRE MORE TIME PER INTERPRETED BYTE THAN NON-GRAPHIC COMMANDS.

IF YOU CANNOT MAKE IT RUN FAST, YOU MIGHT AS WELL MAKE IT ENTERTAINING. TRY TYING SOME OF YOUR VARIABLES TO THE SOUND SYSTEM INPUTS. A MUSICAL DIVERSION WILL LET THE OPERATOR KNOW THAT THE PROGRAM IS STILL WORKING, AND HASN'T DROPPED DEAD OR FOUND A LOOP.

# ARCADIAN

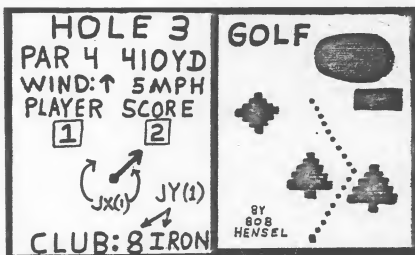
```

4 .GOLF
5 .BY BOB HENSEL
100 FOR Z=1TO N;@(Z)=0;NEXT Z;B=0;FOR H=1TO 9;GOSUB 3600
102 FOR P=1TO N;U=0;J=0
104 IF P=1G=13+RND (50);I=15+RND (15);T=13+RND (50);R=13+RND (50);S=13+RND (50)
;B=B+Ic5
105 CLEAR ;GOSUB 1000;Y=-16;GOSUB 1100;T=T+18;GOSUB 1100;T=T-18;Y=0;GOSUB 1200
106 Y=10;GOSUB 1300;E=40;F=-41;BOX E,F,1,1,1
142 LINE 3,-43,4;LINE 3,43,1;LINE 79,43,1;LINE 79,-43,1;LINE 3,-43,1
144 PRINT " HOLE #",#1,H;PRINT " PAR ",#1,Ic5," ",#1,Ib20,"YD
146 W=RND (4);M=(RND (6)-1)b5;PRINT " WIND:";TV=93+W;PRINT #3,M,"MPH",
147 CY=8;CX=-71;PRINT "PLAYER SCORE",
148 CX=-56;CY=0;PRINT #1,P,#7,U
150 A=A+JX(1);IF A>16A=1
151 IF A<1A=16
152 X=2;Y=2;GOSUB 800+A
153 LINE -40,-20,4;BOX -40,-20,60,30,2;BOX -40,-20,2,2,1;LINE Xb7-40,Yb7-20,1
155 C=C+JY(1);IF C>9C=1
156 IF C<1C=9
170 CX=-71;CY=-40;PRINT "CLUB:";#1,C;IF C=1PRINT " WOOD";GOTO 180
172 PRINT " IRON",
180 IF TR(1)=0GOTO 150
200 U=U+1;NT=10;MU=C;NT=0
202 IF J=1GOTO 3100
205 FOR Z=1TO 2b(10-C)
210 IF Z#1GOTO 219
212 D=0;IF M>5D=1
214 IF W=1Y=Y+D
216 IF W=2X=X-D
217 IF W=3Y=Y-D
218 IF W=4X=X+D
219 E=E+X;F=F+Y;BOX E,F,1,1,3
220 IF E>3IF E<79IF F<43IF F>-43J=0;GOTO 240
230 GOTO 4000
240 IF E>6-9IF E<6+8IF F>I-8IF F<I+8J=1
250 IF J=0IF PX(E,F)=0GOTO 4000
290 NEXT Z
291 IF J=1GOTO 3000
295 GOTO 148
801 Y=0;RETURN
802 Y=1;RETURN
803 RETURN
804 X=1;RETURN
805 X=0;RETURN
806 X=-1;RETURN
807 X=-2;RETURN
808 X=-2;Y=1;RETURN
809 X=-2;Y=0;RETURN
810 X=-2;Y=-1;RETURN
811 X=-2;Y=-2;RETURN
812 X=-1;Y=-2;RETURN
813 X=0;Y=-2;RETURN
814 X=1;Y=-2;RETURN
815 Y=-2;RETURN
816 Y=-1;RETURN
1000 BOX G,I,4,12,1;BOX G,I,10,10,1;BOX G,I,14,8,1;BOX G,I,16,4,1;RETURN
1100 BOX T,Y,2,10,1;BOX T,Y,2,4,2,1;BOX T,Y,6,2,1;BOX T,Y-2,8,2,1;RETURN

```

Bob Hensel  
8428 Ingleside Ave., S.  
Cottage Grove, MN 55016

Golf is a game of skill for 1 to 4 players. The computer generates 9 different holes each game, randomly placing each green and hazards such as trees, water, or sand traps. Each player selects the direction the ball will travel by moving JX(1) until the rotating line points in the proper direction. The distance is dependent on the club selected using JY(1). Remember the flight of the ball is affected by the direction and velocity of the wind.



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## GOLF (continued)

```

1200 BOX R,Y,2,18,1;BOX R,Y,6,14,1;BOX R,Y,10,10,1;BOX R,Y,14,6,1;BOX R,Y,18,2,1
;RETURN
1300 BOX S,Y,12,5,1;RETURN
3000 BOX 41,0,78,87,2;BOX 41,0,16,48,1;BOX 41,0,40,40,1;BOX 41,0,56,32,1;BOX 41,
0,72,16,1
3010 K=20+RND (36);L=RND (16)-8;BOX K,L,3,3,2;E=41+(E-G)b4;F=(F-I)b4;BOX E,F,1,1
,3;BOX 41,0,79,84,3
3015 IF ABS(E-K)<2IF ABS(F-L)<2GOTO 3500
3017 GOTO 148
3100 FOR Z=1TO 2b(10-C)
3110 E=E+X;F=F+Y;BOX E,F,1,1,3
3120 IF ABS(E-K)<2IF ABS(F-L)<2GOTO 3500
3130 IF E>3IF E<79IF F<43IF F>43GOTO 3140
3135 GOTO 4000
3140 NEXT Z;GOTO 148
3500 CY=0;CX=30;PRINT "SUNK!";@(P)=@(P)+U
3510 GOSUB 3610;NEXT P;NEXT H
3600 CLEAR ;PRINT " PAR=",#1,B;FOR Z=1TO N;PRINT " PLAYER",#2,Z,"=",#1,@(Z),#4,@
(Z)-B;NEXT Z
3610 FOR O=1TO 1000;NEXT O;RETURN
4000 CY=-20;CX=-59;PRINT "PENALTY";NT=40;MU=60;MU=60;MU=60;NT=0;U=U+1;GOSUB 3610
;GOTO 148
    
```

# ARCADIAN

```

1 .
2 .
3 .
4 .
5 .MUSICAL STAFF
6 .BY BOB WISEMAN
10 GOSUB 950
20 N=N+1
30 GOSUB 300;IF WGO TO 50
40 GOSUB 200;GOTO 20
50 GOSUB 400;X=X-9
60 C=JX(1)+2bJY(1)
70 IF C=0GOTO 60
80 IF C=-2GOTO 10
90 FOR M=0TO N-1:P=@(M)c50;T=RM
100 GOSUB 700;NEXT M
110 IF C=2IF TR(1)=0GOTO 120
115 GOTO 30
120 FOR M=0TO 100;NEXT M;GOTO 85
200 @(N)=50bP+T;RETURN
300 X=X+9;IF X>70X=-70;Y=15-Y;GOSUB 500
310 GOSUB 800;GOSUB 700
320 IF TR(1)+TR(2)W=TR(2);RETURN
330 U=JX(1);W=JY(1)
340 IF U=0IF W=0U=0;GOTO 320
350 IF U=1GOTO 320
360 U=1;P=P+W;IF (P>19)+(P<0)P=P-W
365 IF U=0GOTO 385
370 IF U<0T=Tc2
380 IF U>0T=T+T
385 IF T>32T=32
387 IF T<2T=2
390 GOSUB 400;GOTO 310
400 BOX X+1,Y+7,10,12,2
405 BOX X+1,Y-27,10,14,2
410 FOR U=Y-17TO Y-2STEP 5
415 BOX X+2,U,10,4,2;NEXT U
420 RETURN
500 BOX 0,Y-10,160,44,2
505 FOR Y=20TO YSTEP 5
510 BOX 0,U,160,1,1;NEXT U
515 RETURN
700 @(16)=49;@(17)=@(B-P);@(22)=127
710 FOR A=0TO 20bT;NEXT A
715 @(22)=0
790 RETURN

```

```

800 I=0;IF P=Pc2b2I=1
810 U=Y-(20-P)b5c2+16
815 BOX X,U,5,4,1
818 IF (P<5)+(P>15)GOSUB 900
825 IF T>12BOX X,U,3,1,2;IF I=0BOX X,U-1,3,1,2
830 IF T=32RETURN
835 H=5-I
845 IF P>11H=-H-2+I
847 K=2bABS(H)-1
850 BOX X+2,H+U,1,K,1
855 IF T>6RETURN
856 IF H<0K=2-K

```

MUSICAL STAFF writes notes in the key of C, using controller #1. JY command changes the note, while JX command changes the length. TR enters the note. Controller #2 plays the tune once, repeatedly, or starts over.

```

858 IF T>3IF P>11GOTO 870
860 BOX X+3,K+U,3,1,1
865 IF T>3RETURN
870 BOX X+3,K+U-2,3,1,1;RETURN
900 IF P>15BOX X,Y+5,8,1,1
905 IF P>17BOX X,Y+10,8,1,1
910 IF P<5BOX X,Y-25,8,1,1
915 IF P<3BOX X,Y-30,8,1,1
920 RETURN

```

Bob Wiseman  
118 St. Andrews Dr.  
Cincinnati OH 45245

```

950 :RETURN ;NT=0;CLEAR
951 M=S2c2;N=M;A=1000;B=90;GOSUB A;B=80;GOSUB A
952 B=71;GOSUB A;B=67;GOSUB A;B=60;GOSUB A;B=53;GOSUB A;B=50;GOSUB A
953 B=44;GOSUB A;B=39;GOSUB A;B=35;GOSUB A;B=33;GOSUB A;B=29;GOSUB A;B=26;GOSUB A
954 B=24;GOSUB A;B=22;GOSUB A;B=19;GOSUB A;B=17;GOSUB A;B=16;GOSUB A;B=14;GOSUB A
960 P=4;T=8;N=-1
961 B=M
965 X=70;Y=-10;RETURN
1000 N=N-1;@(N)=B;RETURN

```



A selection of short programs from the programming efforts of  
Dieter Heinerman, 305 4th Ave. S.W. #1511 Calgary, Alberta, Canada T2P 0J8

```

1 .
2 .
3 . 3D CORNERS
4 . BY DIETER HEINERMAN
9 NT=0
10 CLEAR
11 FC=7
16 FOR A=1TO 44STEP 1
17 IF TR(1)=1GOTO 50
18 IF TR(2)=1CLEAR
19 BC=7bB
20 BOX A,-A,A,A,3
25 BOX -A,A,A,A,3
30 BOX A,A,A,A,3
34 BOX -A,-A,A,A,3
35 &(22)=255;&(18)=A
36 NEXT A
37 B=RND (255)
39 FC=B
40 GOTO 16
50 FOR A=44TO 1STEP -2
70 GOTO 20

```

```

2 .
3 . ELECTRONIC BLANKED
4 . BY DIETER HEINERMAN
5 NT=0
9 CLEAR
10 A=RND (6)
11 FOR E=1TO 5
12 .TRY NT=A
13 &(22)=255
15 IF E=5GOTO 90
20 FOR B=-70TO 70STEP A
25 &(17)=B;&(18)=BbA
30 C=RND (6)
35 IF TR(1)=1GOTO 9
40 FOR D=-40TO 40STEP C
41 MU=BC
42 BC=B+200
43 FC=BC-53bC
45 &(16)=DbC
46 &(20)=A+CbD
50 BOX B,D,A,A+C,3
60 NEXT D
70 NEXT B
75 NEXT E
80 GOTO 10
90 PRINT "  WANT MORE? PRESS 1"
100 IF &(23)=8GOTO 9
110 GOTO 100

```

```

1 .
2 .
3 .
4 . DENOMINATOR
5 . BY DIETER HEINERMAN
6 CLEAR
7 BC=56
8 NT=1
9 PRINT ;PRINT " INPUT DENOMINATOR
10 INPUT " ",N
20 FOR T=1TO N-1
30 X=0
40 PRINT
50 A=T
60 PRINT #2,A,#1,"c",#1,N,#1,"=-.",
70 IF (Ab10)cN<1GOTO 140
80 A=Ab10
90 PRINT #1,(AcN),
100 X=X+1
110 IF X>N-1GOTO 190
120 A=A-(AcN)bN
130 GOTO 70
140 A=Ab10
150 PRINT #1,0,
160 X=X+1
170 IF X>N-1GOTO 190
180 GOTO 70
190 NEXT T
200 IF &(23)=1GOTO 1
210 GOTO 200

```

```

1 .BOXES
2 .
3 .
4 .
5 NT=10
6 CLEAR
7 BC=127
10 &(22)=255
20 FOR C=1TO 100STEP 1
30 FC=BbA
40 A=RND (140)-70
50 B=RND (80)-40
55 MU=A
56 &(18)=B
57 &(20)=C
60 BOX A,B,5,5,3
61 BOX -A,B,5,5,3
62 BOX A,-B,5,5,3
65 BOX -A,-B,5,5,3
70 IF C>99GOTO 90
80 NEXT C
90 FOR E=1TO 10STEP 1
95 MU=E
100 IF E=10CLEAR
110 IF TR(1)=1GOTO 10
120 NEXT E
130 GOTO 90

```

ADS:WANTED: Used Bally interface in good working condition - cheap.

R. Ruppert 2722 Pyramid Ave., Pittsburgh PA 15227

FOR SALE: Software by W&W Software Sales, 6594 Swartout Rd. Algonac MI 48001. Nine tapes with five programs each, plus a new one for the Blue Ram (This one is available on tape only, \$5., and called 'Bally Nuclear Power Plant') See ad on p. 10 for more details...

FOR SALE: Cartridges because UPS lost my Arcade: BASIC, INTERFACE at \$35 each; BASEBALL/FOOTBALL/SEA WOLF/CLOWNS/MATH BINGO/280ZZAP/STAR BATTLE/RED BARON/BLACKJACK at \$15 each. Check or money order plus \$1. to Randy Rienth, Rt 1 Box 73H, Gloucester, VA 23061

FOR SALE: Software by Rob Rosenhouse, 44 Forestbrook Dr., North Plainfield, NJ 07060. Super Software now offers 6 sets of programs including a new one based on Missile Command by Atari. For catalogue including 2 RND(ART) programs, send a large SSAE

USER GROUPS: If you are in the following areas, contact the persons listed:  
Metropolitan Washington, DC-Jerry Heere, 2802 Avon Ave Silver Spring 19608  
Westchester Co.area NY-Dan Simpson Box 229 Somers, NY 10589  
914-248-7058

FOR SALE: Bally factory games and accessories - special discount to ARCADIAN subscribers. For free price list, write to SFP, 1064 N. Alta Ave. Dinuba, CA 93618

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**SHOWS AUGUST DATE FOR**  
**ADD-ON.**

≡ 50 ≡

## ARCADIAN

Robert Fabris, yellow ribboned  
The SOURCE TCD 959  
3626 Morrie Dr.  
San Jose, CA 95127

FIRST CLASS

PREPARATION of the ARCADIAN has been modified slightly by the obvious use of the COMPRINT printer for text as well as programs. I am using the MUSE "SUPER-TEXT" word processor on my Apple to prepare this issue. Aside from being able to type the material and then store it for future use or revision, the output is nicely justified so that the right side margin is neat.

WEST COAST COMPUTER FAIRE is coming up shortly, due in San Francisco on the April 4 weekend, Brooks Hall.

I shall have booth 09 there, up against the wall, and we (Dick Houser and I) shall have all the items we have been talking about in the ARCADIAN there, maybe some new ones as well. If in the area, please drop by to visit with us. Local subscribers are invited to drop me a card if you can help out for an hour or two at the show.

TELEPHONE NUMBERS here at headquarters are (408) 258-4586 for the private line, 272-2364 gets the rest of the family.

CORRECTIONS required to previous programs.

GOLF Bob Hensel writes that the following should be added to the program after the listing shown in the last issue:

```
:RETURN;NT=0;BC=25;FC=92;&(0)=170;&(1)=170;&(2)=7;&(3)=7;INPUT
N;&(9)=20;GOTO 100
```

The inputted N is the number of players, 1 to 4. Have to apologize here, this line, which was on Bob's tape, does not print out when you list the program, and I didn't notice it.

GRANDFATHER CLOCK In line 15, the values of @(14) and @(15) should be swapped - it goes bong-bing instead of bing-bong.

MUSICAL STAFF Line 120, last statement should read GOTO 850  
The zero dropped out.

ALTERNATIVE ENGINEERING reports that due to a problem in locating more of the transformers used in their power supplies, they have temporarily discontinued this product.

THE DIGITAL COUCH PROGRAM WAS REWRITTEN FOR THE BALLY FROM A PROGRAM BY DAVID TUNBO. ORIGINALLY PRESENTED IN CREATIVE COMPUTING, AND WRITTEN FOR THE OHIO SCIENTIFIC CHALLENGER II.

THE DIGITAL COUCH PROGRAM TURNS YOUR COMPUTER INTO A PSYCHIATRIST. IT DRAWS A PICTURE NOT UNLIKE AN INKBLOT AND GIVES THREE CHOICES AS TO WHAT THE PICTURE LOOKS LIKE. THE PROGRAM KEEPS SCORE AND RATES THE PLAYER WHEN THE "TESTS" ARE OVER.

THIS PROGRAM IS NOT TO BE TAKEN SERIOUSLY, AND WOULD PROBABLY BE BEST PUT TO USE AT PARTIES, ETC.

THE CHOICES GIVEN, AND CONCLUSIONS REACHED, ARE RANDOM.

THANK YOU,  
BOB WEBER

# ARCADIAN

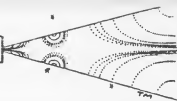
## DIGITAL COUCH

```

10 :RETURN ;CLEAR ;GOSUB 1005:S=0;FOR J=1TO K;CLEAR ;X=30;Y=20;B=0;BC=RND (256
);FC=BC+12;BOX X,Y,3,3,1
20 A=RND (4);IF A=4X=X+3;IF (X>70)+(PX(X,Y))A=RND (3);X=X-3
30 IF A=4GOTO 100
40 IF A=3X=X-3;IF (X<0)+(PX(X,Y))A=RND (2);X=X+3
50 IF A=3GOTO 100
60 IF A=2Y=Y+3;IF (Y>40)+(PX(X,Y))A=1;Y=Y-3
70 IF A=2GOTO 100
80 Y=Y-3;IF (Y<0)+(PX(X,Y))A=0;Y=Y+3
90 IF A=1GOTO 100
95 B=B+1;IF B=9GOTO 200
100 BOX X,Y,3,3,1;GOTO 20
200 CY=0;F=0;PRINT "IS THIS A:";C=RND (12);IF RND (3)=2F=C;G=1
210 D=RND (12);IF D=CGOTO 210
215 IF RND (3)=2F=D;G=2
220 E=RND (12);IF (E=C)+(E=D)GOTO 220
225 IF RND (3)=2F=E;G=3
226 IF F=0F=D;G=2
230 PRINT "(1) ";GOSUB Cb1000;PRINT "(2) ";GOSUB Db1000;PRINT "(3) ";GOSUB E
b1000
240 L=KP-48;IF L=GGOTO 400
250 PRINT "NO, IT'S A:";GOSUB Fb1000;GOSUB (RND (4)+12)b1000
300 FOR Z=1TO 999:NEXT Z;NEXT J
310 H=(Sb100)cK;PRINT "LET'S SEE NOW.";PRINT "YOUR SCORE IS ",#1,H,"%";PRINT "I
WOULD SAY....
320 IF H<20PRINT "YOU REALLY ARE A MESS!
330 IF H<40IF H>19PRINT "THAT YOUR BRAIN IS HALF A BUBBLE OFF CENTER!
350 IF H<70IF H>39PRINT "THAT YOU SHOULD BE KEPT AWAY FROM SHARP OBJECTS!
360 IF H>69PRINT "TO GET THIS MANY RIGHT, YOU MUST BE TWISTED!
370 STOP
400 PRINT "VERY GOOD! THAT'S RIGHT!";S=S+1;GOTO 300
1000 PRINT "RODNEY";RETURN
1005 PRINT "THE DOCTOR WILL SEE YOU NOW.";PRINT "HELLO, I'M GOING TO SHOW YOU
A SERIES OF PICTURES.
1010 PRINT "WHEN I ASK YOU, INDICATE WHICH OF THE THREE CHOICESIT LOOKS LIKE TO
YOU.
1020 PRINT "BASED ON YOUR ANSWERS, I WILL EVALUATE YOUR MIND.
1030 PRINT "HOW MANY DO YOU WANT?";K=KP-48;IF K<1GOTO 1030
1040 IF K>5PRINT "MAKE IT EASY ON YOURSELF--NOT SO MANY.";GOTO 1030
1050 RETURN
2000 PRINT "SICK STAIR CASE";RETURN
3000 PRINT "CAT FLYING UPSIDE DOWN";RETURN
4000 PRINT "BIRD IN A HALTER TOP";RETURN
5000 PRINT "PEANUT BUTTER ROCKET";RETURN
6000 PRINT "DRUNK WITH FLAT TIRE";RETURN
7000 PRINT "WILTED FIRE PLUG";RETURN
8000 PRINT "PLATE OF REFRIED BEANS";RETURN
9000 PRINT "FROG WITH NUDE";RETURN
10000 PRINT "CREEPY CANAL";RETURN
11000 PRINT "NAZI ANT HILL";RETURN
12000 PRINT "MARTIAN PAGODA";RETURN
13000 PRINT "HMMMMMM";PRINT "YOU NEVER HAD A PUPPY AS ACHILD, DID YOU?
13010 PRINT "THINGS LIKE THAT SHOW!";RETURN
14000 PRINT "THAT IS A VERY REVEALING CHOICE!!!";RETURN
15000 PRINT "YOUR ANSWER IS NOT CORRECTBUT IT IS MEANINGFULL.";RETURN
16000 PRINT "YOU'RE CLOSE, BUT NOT";PRINT "RIGHT. YOU SHOULD HAVE COME TO ME
SOONER.";RETURN

```

Bob Weber  
6594 Swartout Rd.  
Algonac, MI 48001



TOWER OF HANOI is an old game, originally played with a set of rings to be placed on three pegs mounted on a board. The number of moves required to shift the pile from one location to the final location is equal to  $2^n - 1$ , where  $n$  is the number of blocks. For a four-block pile then, the minimum number of moves is 15. I dug into an old Johnson-Smith catalog to find the puzzle available there for 35 cents, but the catalog is 40 years old...

**COMMENTS** Bert Holmes writes: I too have had trouble loading at NT=0 but I found that it only happens when trying to overcopy a previous program. This may happen when trying to load a copy of the same program if the first line (usually a throw-away for just this purpose) is missed due to plug-in or voice leader noise. The Bally then sees the incoming line as a replacement and must insert and shift the text. However, if the Bally is RESET the program seems to load flawlessly. In summary, for entries which simply add on to the current program without insertion (and need to relocate program within memory) NT=0 should work.

**COINCIDENTALLY** to the material received from Bob Wiseman, the following comments from Bert Holmes are appropriate. "I have succeeded in making another computer with RS232 I/O talk to the Bally. One problem has been that the Bally expects high level input (as from the output of a tape recorder), while the output of the computer is low level, as expected by a tape recorder. High level is actually reduced to low level by voltage division via R3,R2 in the tape interface of the Bally. By unsoldering one end of R3 low level inputs can be accepted." Perhaps there is a relatively simple rewiring of the cassette interface which will enable transmission of signals in both directions at the proper levels. Note that Bert's comments are talking to the situation where the Bally is receiving input only, not sending out data. Bert continues that a simple program to pump out ASCII characters was needed, plus a need to initialize each session with FF (hex) to synchronize the Bally to his other computer (by sending out a series of ones).

**APPLE TO BALLY INTERFACE** has been developed by Bob Wiseman. (See his ad on p.60) The programs he provides are in machine code (insert through the Apple's monitor) and they allow you to dump to and load from the Bally, and allow Apple keyboard input to go to the Bally. The four programs load at \$4200, \$4400, \$4600, and \$4800 in the Apple, but instructions are provided so that you can change these. In addition, instructions are also provided in case you have Integer Basic instead of Applesoft. Data itself is stored starting at \$5000. The keyboard input can be run without a disc system and so is worth the asking price by itself.

All four routines are combined by means of a "File Handler" program that makes it all work together in a business-like manner. And a printer connected to the Apple will give you hard copy as well. Connection between the two machines is by way of the cassette ports of each. Bob recommends amplification of the signals and proposes that the cassette recorder be placed in the system to allow its internal amplifier to boost the signals enough to register.

# ARCADIAN

000 110000  
100 ST. MURPHY DR.  
CINCINNATI, OHIO 45245

```

1 .
2 .
3 .
4 . TOWER OF HANOI
5 . BY BOB WISEMAN
6 CLEAR ;INPUT "HOW MANY BOXES?" R
7 @(0)=9
8 BC=159;FC=11
9 CLEAR ;A=0;C=1
10 CX=-65
11 PRINT "TOWER OF HANOI",
12 FOR X=1TO 21
14 @(X)=0;NEXT X
16 IF R>7 R=7
20 FOR T=RTO 1STEP -1
30 B=T;GOSUB 400;NEXT T
100 IF @(1)=0IF @(8)=0GOTO 900
105 IF @(1)=0IF @(15)=0GOTO 900
110 GOSUB 600;GOSUB 500
130 IF B=0GOTO 110
140 GOSUB 600;GOSUB 400
160 IF B#0GOTO 140
165 A=A+1
166 CX=60
170 PRINT #3,A,
180 GOTO 100
400 D=(C-1)*7+1
402 IF @(D)=0X=D;GOTO 430
405 FOR X=DTO 21
410 IF @(X)=0GOTO 420
415 NEXT X
420 IF B>@(X-1)GOTO 480
430 @(X)=B;GOSUB 700
440 B=0;GOTO 490
480 FOR X=1TO 5
485 MU="Z";NEXT X
490 RETURN
500 D=(C-1)*7+1;B=0
510 FOR X=DTO 21
515 IF @(X)=0GOTO 530
520 NEXT X
530 X=X-1
540 IF X<0GOTO 585
550 B=0(X);GOSUB 700
560 @(X)=0
565 GOTO 599
585 FOR X=1TO 5
590 MU="Y";NEXT X
599 RETURN
600 IF &(16)=0MU="T";GOTO 620
610 GOTO 600
620 C=0;D=&(16)
630 IF D=4C=1
640 IF D=1C=2
650 IF D=8C=3
660 IF C=0GOTO 620
690 RETURN
700 Z=-72+36*B
705 Y=(X-1)*7
710 Y=-35+10*B*R
720 W=5*B
730 BOX Z,Y,W,9,3
740 MU=B.
790 RETURN
900 CLEAR
905 BC=6;FC=0
906 PRINT " ",
910 PRINT "YOU FINISHED "
920 PRINT " THE TOWER IN",#3,A," MOVES"
921 B=1;FOR X=1TO R
922 B=B*2;NEXT X
924 A=A-B+1
925 IF A=0PRINT "GREAT WORK";GOTO 928
926 IF A<R*2PRINT "NOT TOO BAD"
927 IF A>2*BPRINT "KEEP TRYING"
928 PRINT " YOU WASTED",#4,A," MOVES"
930 PRINT "PULL TRIGGER TO PLAY"
935 R=R+1
940 IF TR(1)=1GOTO 2
950 GOTO 940

```

## TOWER OF HANOI

THE OBJECT OF THIS PUZZLE IS TO REBUILD THE TOWER OF HANOI IN A NEW LOCATION. YOU WILL BE ASKED HOW MANY BLOCKS YOU WANT. ALL THESE WILL BE STACKED IN DESCENDING ORDER ON THE LEFT. NOW YOU MUST MOVE THEM AROUND TO REBUILD THE TOWER IN THE CENTER OR ON THE RIGHT. A LARGER BLOCK MAY NOT REST ON A SMALLER BLOCK. MOVING A BLOCK IS DONE IN TWO STAGES. FIRST, YOU ERASE IT. THEN YOU REDRAW IT. ONLY THE TOP BLOCK OF A STACK MAY BE MOVED. TO INDICATE WHICH STACK YOU WANT, USE THE HAND CONTROL.

This is part 2 of Bob  
Wiseman's tutorial on  
techniques.

---

## PART III. TRICKS OF THE TRADE.

---

HERE I WILL ENTERTAIN YOU TO A FEW PROGRAMMING TRICKS I HAVE  
CONJURED UP WITH THE BALLY.

### TRICK 1 - HOW TO KEEP TRACK OF PIECES ON A BOARD GAME.

RATHER THAN CREATE A TABLE OF WHO IS WHERE, IF YOU ARE  
SHORT OF MEMORY YOU CAN OFTEN USE THE PX(X,Y) COMMAND.

SUPPOSE WE HAVE THREE POSSIBILITIES:

NBODY, AN "X", A "O".

CHECK TWO SQUARES WITH THE PX COMMAND: THE BOTTOM CENTER  
AND THE BOTTOM LEFTMOST. COMPUTE  $P=PX(L,B)+PX(C,B)$ .

THIS WILL GIVE US THE CORRESPONDING ZERO, ONE, AND TWO FOR  
SPACE, "X" AND "O".

THIS WILL NOT BE FAST AND SHOULD ONLY BE USED WHEN  
MEMORY IS IN VERY SHORT SUPPLY.

### TRICK 2 - CODING THE FANCY "IF" STATEMENT.

WHEN EVALUATING LOGIC STATEMENTS, BALLY BASIC ASSIGNS A TRUE  
VALUE TO ANYTHING BUT ZERO. STATEMENTS THAT EVALUATE TO ZERO  
ARE FALSE. SIMILARLY, IF SOMETHING IS TRUE, THE ARCADE GIVES IT  
THE VALUE ONE. IF SOMETHING IS FALSE, THE VALUE ZERO.

EXAMPLE:

```
10 A=0
20 IF APRINT"HI THERE"
```

THE VALUE OF A IS ZERO, WHICH IS FALSE, SO THIS WILL NOT PRINT  
ANYTHING. CONVERSELY,

```
10 FOR N=-1 TO 2
20 IF NPRINT"HI THERE"
30 NEXT N
```

THIS WILL PRINT "HI THERE" FOR THE NON-ZERO VALUES OF N (-1,1,2).  
THREE LINES WILL BE PRINTED. NOW WE CAN GET FANCY. SUPPOSE THAT  
WE WANT TO PRINT SOMETHING IF A IS 4 OR IF B IS 5. FIRST OF ALL,  
THE STATEMENT:

```
10 C=(A=4)
```

WILL SET C EQUAL TO 0 (FALSE) IF A IS NOT EQUAL TO 4. C WILL BE SET  
EQUAL TO 1 (TRUE) IF A IS EQUAL TO 4. SO WE CAN SAY:

```
10 C=(A=4)
20 D=(B=5)
30 IF C+DPRINT"HI THERE"
```

NOTE THAT C+D WILL BE ZERO ONLY IF C AND D ARE BOTH ZERO. SO C+D IS THE SAME AS (C OR D). TO SIMPLIFY THIS, WE CAN WRITE

```
10 IF (A=4)+(B=4)PRINT"HI THERE
```

SO A "+" WORKS LIKE THE WORD "OR". AS YOU WOULD EXPECT, THE "\*" WORKS LIKE "AND". JUST AS ZERO TIMES ANYTHING IS ZERO, FALSE AND ANYTHING IS STILL FALSE. IF WE WANT TO PRINT IF A EQUALS FOUR AND B EQUALS 5, WE CAN WRITE:

```
10 IF (A=4)*(B=4)PRINT"HI THERE
```

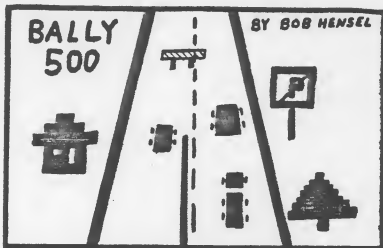
THESE CAN BE COMBINED INTO BIZZARE, UNREADABLE COMBINATIONS. THERE IS A FINE TRADEOFF BETWEEN KEEPING IT SIMPLE AND MAKING IT FIT.

```
10 IF ((A<4)*(A>0))+(A>10)PRINT"HI THERE
```

THIS WILL PRINT IF THE VALUE OF A IS 1, 2, 3 OR IS GREATER THAN 10. I AM OFTEN STRUCK BY BRILLIANT FLASHES THAT MAKE PERFECT SENSE. LATER, WHEN TRYING TO DEBUG, I SUFFER THE "WHO WROTE THIS GARBAGE?" PHENOMENON. AGAIN, WRITING ON PAPER AND MAKING NOTES IS THE BEST ADVICE THAT I HAVE TO OFFER.

Bally 500 is a game of driving skill for 2 or 3 players. One player controls the turns in the road with KN(4). The other players control the cars with KN(1) and KN(2). Road blocks, accidents, and other cars are randomly placed in your path. If you hit one your car is destroyed. The object is to see how long you can stay on the road, and beat your opponent. An elapsed time is indicated at the top left of the screen.

Skill level:3(hard)-10(easy)



Next issue will have a comprehensive report of the latest Dearborn User Group meeting, at which location the Add-Under was shown and thoroughly gone over.

We will also have the first major advertising for the VIPER memory addition.



# ARCADIAN

```

2 .BY BOB HENSEL
5 :RETURN ;CLEAR ;A=0;B=0;P=0
6 X=0;Y=10;Z=-10
7 NT=1;S=0;T=0
8 BC=126;FC=249
9 GOSUB 4000;BOX 0,0,50,80,1
10 X=X+KN(4)*20
20 Y=Y+KN(2)*20
25 Z=Z+KN(1)*20
30 T=T+1;S=S+1
100 BOX X,-39,50,8,1
105 BOX X,-36,2,2,3
110 IF P>0BOX X,-39,6,8,3;P=P-1
190 IF A=0BOX Y,-8,2,4,3
200 IF B=0BOX Z,-16,3,4,3
242 IF T<LGOTO 299
245 C=1;IF X>0C=-1
247 GOSUB 1800+100*NRND (10)
249 GOTO 299
299 IF T-L=0T=0
300 CY=-40;CX=-77;PRINT
301 CX=-70;CY=40;PRINT #1,S
302 IF A>0IF B>0GOTO 3000
305 IF A>0GOTO 380
310 IF PX(Y,0)=1GOSUB 1000
350 BOX Y,0,2,4,3
380 IF B>0GOTO 10
390 IF PX(Z,-8)=1GOSUB 1050
400 BOX Z,-8,3,4,3
700 GOTO 10
1000 CX=Y;CY=0;PRINT "*",
1005 A=S
1010 GOTO 1060
1050 CX=Z;CY=-8;PRINT "*",
1055 B=S
1060 NT=10;MU=67;MU=67;MU=67;MU=67;NT=1;RETURN
1900 .TRUCK
1905 C=Cb12
1907 BOX X+C,-32,5,5,3
1910 BOX X+C+4,-32,1,2,3
1920 BOX X+C-4,-32,1,2,3
2000 .CAR
2002 IF ABS(C)>1GOTO 2010
2005 C=Cb12
2010 BOX X+C,-39,5,8,3
2020 BOX X+C+4,-37,1,2,3
2030 BOX X+C-4,-37,1,2,3
2040 BOX X+C+4,-41,1,2,3
2050 BOX X+C-4,-41,1,2,3
2060 RETURN
2100 .HOUSE
2105 C=Cb45
2110 BOX X+C,-38,12,10,3
2120 BOX X+C,-32,8,2,3
2130 BOX X+C,-36,16,2,1
2140 BOX X+C-2,-39,2,2,3
2150 BOX X+C+2,-40,2,4,3
2160 RETURN

```

```

2200 .TREE
2205 C=Cb40
2210 BOX X+C,-28,2,2,3
2220 BOX X+C,-30,4,2,3
2230 BOX X+C,-32,6,2,3
2240 BOX X+C,-34,8,2,3
2250 BOX X+C,-36,10,2,3
2260 BOX X+C,-40,2,6,3
2270 RETURN
2300 .SIGN
2303 IF P>0RETURN
2305 C=Cb50
2320 BOX X+C,-29,12,12,3
2325 BOX X+C,-29,8,8,3
2330 CX=X+C;CY=-29;PRINT "P",
2335 LINE CX-9,CY-4,4;LINE CX-3,CY+2,1
2336 P=15
2340 BOX X+C,-39,2,8,3
2350 RETURN
2400 .LOG
2410 BOX X-3,-38,24,5,2
2415 BOX X-10,-41,2,4,2;BOX X+3,-41,2,4,2
2420 RETURN
2500 .CRASH

```

```

2510 BOX X+8,-28,10,4,2
2520 GOSUB 1900
2530 RETURN
2600 C=-1bC;GOTO 1900
2700 C=-1bC;GOTO 2000
2800 RETURN
3000 .END
3005 CY=-40;CX=-23;PRINT "GAME OVER";FOR K=1TO 1000;NEXT K
3010 CLEAR ;CY=24;PRINT "SCORE";PRINT
3020 PRINT "PLAYER 1 PLAYER 2"
3030 PRINT
3040 PRINT B," ",A
3050 STOP
4000 .TITLE
4010 CY=0;PRINT "B A L L Y 5 0 0";CY=-8;CX=-6;PRINT "BY
4020 PRINT "BOB HENSEL
4025 PRINT
4030 INPUT "SKILL LEVEL="L;CLEAR ;RETURN

```

Bob Hensel  
8428 Ingleside Ave., S  
Cottage Grove, MN 55016

SKILL LEVEL="L;CLEAR ;RETURN

# ARCADIAN

```

1  .
2  . DEFUSE
3  . BY DIETER HEINERMAN
4  CLEAR
5  NT=2
10 BC=8;FC=100
20 PRINT ;PRINT
30 PRINT " DEFUSE
35 PRINT
40 PRINT " NEED INSTRUCTIONS?".
41 PRINT
45 PRINT " PRESS 1 FOR YES"
46 PRINT
50 PRINT " PRESS 2 FOR NO"
51 PRINT
55 FOR H=1 TO 2400
60 IF &(23)=8GOTO 90
65 IF &(22)=8GOTO 260
70 NEXT H
80 FC=9;GOTO 40
90 CLEAR
100 PRINT
110 PRINT " YOU ARE IN A GOVERNMENT"
120 PRINT "EXPERIMENTAL BUILDING WITH"
130 PRINT " 1,000,000 ROOMS IN IT."
140 PRINT " 100 LONG(0a99)"
150 PRINT " 100 WIDE(0a99)"
160 PRINT " 100 HIGH(0a99)"
170 PRINT " IN IT A BOMB IS HIDDEN "
180 PRINT " THE BOMB SENDS OUT "
190 PRINT " SIGNALS THAT GET STRONGER"
200 PRINT " AS YOU GET CLOSER"
210 PRINT " YOU HAVE 200 SECONDS "
220 PRINT " TO DEACTIVATE IT "
260 CLEAR
270 A=RND (100);B=RND (100)
280 C=RND (100);IF A>0GOTO 310
290 IF B>0GOTO 310
300 IF C=0GOTO 280
310 D=0;E=0;F=0;G=0
315 PRINT
320 PRINT " SIGNAL",10000-((A+B+Cb100)-(D+E+fb100))
330 PRINT " LONG",D
340 PRINT " WIDE",E
350 PRINT " HIGH",F
360 PRINT " SECONDS",G
365 PRINT
370 INPUT D,E,F;CLEAR ;G=G+10;IF A#DGOTO 400
380 IF B#EGOTO 400
390 IF C#FGOTO 525
400 IF G=200GOTO 420
410 GOTO 540
420 PRINT " BOOOOONMM !!! YOU BLEW IT"
425 &(16)=255;&(17)=255;&(18)=135;&(19)=66;&(21)=255;&(22)=255;&(23)=255
426 FOR X=7 TO 127;BC=X;NEXT X;FOR X=16 TO 23;&(X)=0;NEXT X
430 PRINT " THE BUILDING BLEW UP "
440 PRINT " THE BOMB WAS AT "
450 PRINT " LONG",A
460 PRINT " WIDE",B
470 PRINT " HIGH",C
490 PRINT
495 PRINT "WANT TO PLAY AGAIN?"
500 PRINT " PRESS 1"
505 PRINT
510 IF &(23)=8GOTO 260
515 GOTO 510
520 GOTO 800
525 PRINT ;PRINT
530 PRINT " BOMB DEFUSED AT " ,G,"SECONDS";GOTO 490
540 IF D>99GOTO 610
550 IF D<0GOTO 610
560 IF E>99GOTO 610
570 IF E<0GOTO 610
580 IF F>99GOTO 660
590 IF F<0GOTO 660
600 GOTO 315
610 PRINT " YOU WALKED OUT A WINDOW"
620 PRINT "ON THE";IF F<4GOTO 740
625 PRINT F,"TH FLOOR!!!!"
630 PRINT " YOU WERE KILLED AND"
640 PRINT 200-G,"SECONDS LATER"
650 PRINT " THE BUILDING BLEW UP!!!!";GOTO 490
660 PRINT " YOU ARE NOW",fb9
670 PRINT " FEET IN THE AIR!!!!";GOTO 630
680 PRINT " YOU ARE NOW ",-1b(fb9)
690 PRINT " FEET UNDERGROUND!!!!";GOTO 630
740 IF F=1GOTO 770
750 IF F=2GOTO 780
760 IF F=3GOTO 790
770 PRINT " 1ST FLOOR";GOTO 630
780 PRINT " 2ND FLOOR";GOTO 630
790 PRINT " 3RD FLOOR";GOTO 630
800 CLEAR
810 GOTO 490

```

DEFUSE is a three-dimensional guessing game where you have to locate a point in the center using 'hot-cold' type clues.

Dieter Heinerman  
505 4th Ave SW #1511  
Calgary, Alberta, Canada  
12P 0J8

## MEMORY

The memory system of the Bally, and the Bally basic language that goes along with it, only works in 1800 bytes of space. Physically adding memory chips to the system, wiring them into the circuit, will have no effect because the Bally basic 'can't count higher than 1800' when it comes to looking for memory space. This has been a major stumbling block in the way of making this machine into a useful computer. Last year, the Blue Ram was developed to get around this block by making it possible to program machine language codes into the Bally, up to 4K. Bally Basic still could not address this space, but we thought that expansion of user knowledge into the area of machine code programming would be beneficial. A more universal expansion of the system would be to remove the 1800 byte constraint in the language. We then pressed ahead with what I have been calling the Extended Basic, which is a complete rewrite of the original. By doubling the memory space of the chip to 8k, we could also eliminate some of the space-saving tricks of the original, and get the four colors on the screen and other features. Work on the production of this language is progressing and we hope to have it available by mid-year.

Meanwhile, once the Blue Ram was placed in the hands of users, we discovered that Bally Basic statements could also be placed in the Blue Ram by means of some simple statements, and that means that you can write programs just as before, but make them three times as long, or more complicated, or with more sound or color, etc., as before. This technique is included in the Operating System tape now available.

Coming into production in the immediate future is the VIPER. This scheme allows greater memory expansion than the Blue Ram, at a higher price. The construction of this machine allows the expansion of the unit by adding individual cards, each containing the feature or accessory control that you are interested in. This is the method used in the Apple computer. The design of the base system must then contain enough hardware on it to support all the cards that could be added, and cost accordingly. However, the individual accessory cards would then be relatively inexpensive and be completely compatible, ready to slip into their little slots.

CONTEST FOR PROGRAMS is being planned by AstroVision. If you are looking for an opportunity to gain some recognition, as well as perhaps making a little money, write to AstroVision for their up-coming "Authorship Guide" which will outline the rules, etc., for their contest. They plan to have a number of categories (art, utility, game, etc.) with winners in each. A top prize of \$10,000 will be in the offing. Write to 6460 Busch Blvd., Suite 215, Columbus, OH 43229, attn: D. Dawson.

CARTRIDGE NEWS The only real news is that the GALAXIAN game goes into production 1 March, and a new game titled PIRATE'S CHASE is in the works. The GALAXIAN will have a score storage scheme where four players' score will be kept by the machine as each plays the computer individually (much as a pinball machine does).

## Ads

ARCADIAN PROGRAM TAPES are available from Dick Houser 635 Los Alamos Ave, Livermore, CA 94550 as follows: Volume 1 (20 programs); Volume 2a (22 programs, to p.42); Volume 2b (20 programs, from p.48) at \$25 each. Individual programs also available at \$1 plus tape and postage cost, minimum order, \$10. Send for list/order blank.

APPLE-BALLY INTERFACING PROGRAMS allow communication between Bally and Apple (and use of Apple disc and printer) for storage and loading of programs. Listing at \$5., with all instructions; or on disc (DOS 3.2.1) at \$15 including all documentation and library of programs. Bob Wiseman 118 St. Andrews Dr. Cincinnati, OH 45245

ABC HOBBYCRAFT want everyone to remember that they are still selling the Bally and its accessories, as well as software by L&M and George Moses. They also have a user group going for neighborhood owners. 2155 E. Morgan Ave., Evansville, IL 47711

Protection devices to shield your Bally from inadvertent erasures or entries. These plastic covers prevent operation of the keypad or the reset button. Send \$2. for the pair, postpaid, to Dave Stocker 333 Coronado Dr., Mt. Vernon, IN 47620

Long-time outlet SCHWENK ENTERPRISES report that they are still selling Arcades and Videocades at discount prices by mail. Write for data to 6988 Lincoln Creek Circle, Carmichael, CA 95608. (916) 944-2001

USER GROUP NEWS Northern NJ area, call Rob Rosenhouse at (201) 755-2289. Error in last month's address for the DC group, Jerry Heere's location is Sinking Spring, PA.

SPECTRE is a software-developing company that is looking for ideas and want to hear from subscribers who have thoughts on what the Arcade and Add-Under units should provide. As a result of the recent Dearborn meeting, a questionnaire has been developed, and copies are available from Spectre at 14430 Barclay, Dearborn, MI 48126.

```

% ===== %
%          %
%  NEED MORE BYTES? %
%  NOW!! ADD 4224 MORE BYTES OF STATIC RAM! %
%  WITH THE BLUE RAM ADD ON!! %
%  MODIFY AND WRITE GAME CARTRIDGES TO TAPE!! %
%  NEW OPERATING SYSTEM PROVIDES 5192 BYTES %
%  OF BALLY BASIC WITH EDITOR, PARAMETER %
%  PASSING AND MUCH MORE! %
%          %
%  PRODUCT      KIT      WIRED %
%  THE BLUE RAM ..... $140.00 ... $180.00 %
%  KEYBOARD ..... $24.95 ... $89.95 %
%  BLUE RAM OPERATING SYSTEM (TAPE) .. $9.95 %
%  BSR INTERFACE ..... N/A ..... $19.95 %
%  MODEN ADAPTER ..... $69.95 ..... $89.95 %
%  WITH PRINTER INTERFACE $79.95 ..... $99.95 %
%  * ALL OF THE ABOVE COME COMPLETE WITH %
%  PROGRAM TAPES AND DOCUMENTATION. %
%          %
%  MORE COMING ... %
%  * * * * FAST GRAPHICS IN COLOR * * * * %
%  A "HUMAN" VOICE TO ENHANCE YOUR GAMES! %
%  * * * * AN EX-EXTENDED BASIC * * * * %
%  ORDER FROM THE ARCADIAN OR %
%  PERKINS ENGINEERING %
%  1004 PLEASANT AVE. BOYNE CITY, MICH. 49712 %
%  ===== %

```

= 60 =

## ARCADIAN

Robert Fabris, word processing  
3626 Morrie Dr.  
San Jose, CA 95127

FIRST CLASS

HYPERACTIVE? I'll say. This has been a very interesting month, with activities piling up one atop another. The last issue was sent out a little early to avoid a rush at the printer's, what with everyone trying to get mailings out prior to the postage increase. Then I received an invitation to attend a conference in Chicago with AstroVision and their sales personnel (report below). After that we had the West Coast Computer Faire to get ready for (report below) and then this issue to prepare. So there were a lot of things happening, and here are the stories.

REVIEW OF PRODUCTS BY ASTROVISION. Four of us attended a meeting in Chicago on March 20. Fred Cornett, George Moses, Mike Peace and myself represented the thousands of users of the Bally Arcade at a sales meeting. About 35 distributor organization personnel were there to get the low-down on near term and far future plans. The schedule first:

May 15	Release of the Arcade plus
Aug 1	Release of the AstroVision Basic
Oct 1	Release of the Add Under
1987	Release of a Z8000 Arcade unit

A. The ARCADE PLUS is our familiar Bally friend with a new motherboard. Functions are the same but some parts have been rearranged to alleviate the heat problem and therefore make the unit more reliable. As a result, the shields have been modified and the whole thing under the cover looks different. The reason for the "PLUS" marking is the fact that the AstroVision Basic will be included without additional cost. (The cost of a two-handle unit is still 300.) ((But Montgomery Ward sales will not include the Basic.))

B. The new BASIC cartridge is virtually complete, and only needs the final go-ahead to be placed into production. I mentioned this cartridge on page 40, and I had the opportunity to review one a couple of days before the meeting. It does transfer data at 1800 baud, six times faster than the current unit. It includes an EDIT function, whereby you can recall a line number and make a correction to the commands located there. A special command function allows you to step through the individual letters/numbers in the line. Another feature is a TRACE mode - if a program is running, by pressing LIST, the next line to be executed will show up on the screen and then the computer will perform the operation, then the next line, the next operation, etc., so that in the case of program debugging, you can see if the program is doing what you expect it to (it always does what you tell it to, but that may not be what you expect).

Many of the commands having to do with the sound generating system have been revised from a "&(21)=n" mode to a "NA=n" mode, saving 3 bytes each.

The cassette interface has been moved to the BASIC cartridge itself. There is a single jack at the top of the cartridge for a single cable to the recorder. You have to switch the cable at the recorder between the input and output jacks.

All of this has to be paid for in some way. The \$ mathematical system is gone; the :INPUT n system for program identification is gone; the screen scrolling during tape loading is gone; probably others.

The 1800 baud system is not at all compatible with the old 300 baud system. Not to worry. As a result of every reviewer's comments, a 'hook' was left in the system to allow the new Basic to open hand controller port three so that the old tapes can be loaded into the memory. Then the program can be outloaded onto a new tape at the 1800 baud rate. It does mean that those of you planning to sell your software to "new" people will have to convert your tapes for them, because they won't have the old cassette interface. The new Basic will list at \$55.

.. Tom Wood is finishing up the job of disassembling the new Basic, and we will be able to announce what we will have discovered in the next issue, and also let you know about copies for your own use.

WEST COAST COMPUTER FAIRE took place April 3-5, and neighborhood ARCADE owners found Dick Houser and myself manning the booth at spot 09. We also had help from Tom Wood and Andy Armstrong as Dick and I would make occasional excursions to see what was interesting. At the end of the period, we found that 85 people had signed the visitor's book. We had one Arcade unit running almost full time with Galactic Invasion, plus another one to show off different programs made up by our subscribers. We also had the Blue Ram there with its keyboard and the BSR controller. The latest innovation from Perkins Engineering was also on display, the Bally motherboard with 39 extra IC chips to allow High Resolution color displays. Another prototype piece of hardware was the VIPER 16K memory expansion board. So there were plenty of things to show Dan Dawson, President of AstroVision, when he and vice-President-Marketing Ray George visited the booth. Another welcome visitor was Tim Hays, chief programmer at Sebree's, whose booth was really moving the Atari material.

We could have sold a lot of hardware if we had any. "Galactic Invasion" was a big hit with all - there was always a crowd around the TV when we kept the game in operation. The fine figures, sound, and animation were appreciated especially by those visitors whose own game programs had little more than boxes to be manipulated. There were quite a lot of questions about "Are they still making the Arcade?" "Where can I get the games?"

I appreciated the opportunity to chat with other magazine publishers - Wayne Green of KILOBAUD/MICROCOMPUTING who is coming out with a non-computer's computing magazine in the near future - Dave Ahl of CREATIVE COMPUTING who's March issue had a Bally history article, and who's comments were most interesting - and dapper John Craig of INFOWORLD who had a most attractive young lady on his arm and was busy with plans for his Computer Fair/Flea Market in San Jose, April 25.

EXTENDED BASIC We have in hand a tape that contains the Extended Basic language (in 8K). This tape will be used to generate both tape and rom versions, to be compatible with VIPER and BLUE RAM memory additions, as well as being usable in the basic machine as well. You will be notified when these are available.

Found in the mouldy pages of an ancient copy of Captain Billy's WhizBang:

May the Artesians keep a head on your beer!



SOFTWARE IS THE GAME I was quite interested to see that the distributor group recognized the value of software to the sell-ability of the Arcade game. Since each Arcade will come with the Basic, each and every purchaser is a potential customer for your software. Once the novelty of the included games wears off, they will try the Basic, and possibly get 'hooked'. This paragraph is directed towards the subscriber who has not yet acted seriously on the idea of producing a program that can be marketed. If you have an idea for programs that you think have some potential, drop me a line. All kinds of programs are needed - just pop into a computer store or read the ads in Kilobaud or Creative Computing to see what's on sale. Write something similar in AstroVision Basic. Sell it...

PROGRAMMING CONTEST Authorship Manual is still in work, reports Dick Ainsworth, its author. Dick is hard at work on the new AstroVision Basic Manual, one which will be considerably more comprehensive than the last one, he assured us.

The software workers are also working on such programs as "Pacman", "Gorf", and "Wizard of War". These full-size game names will change as the units are released.

ALTERNATIVE ENGINEERING CORP. sent a production sample of their VIPER 16K RAM card to be displayed at the Faire. (see ad p. 69) It consists of 16 integrated circuits, a 10MHz clock chip, and two sets of DIP switches on a 4x6 plug-in card. The workmanship is excellent, and so is the parts quality. Most of the IC's are LS type. This board (and system) is compatible with the Blue Ram software.

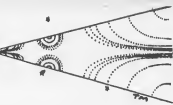
PERKINS HI-RES BOARD was also received just in time for the show. This board is the standard Bally motherboard with a number of ICs added, most by piggy-back technique onto existing chips. Many extra connections are made to make the item 'work'. When powered up, the picture we normally see filling the screen was reduced to one-fourth the size, and occupied the upper left quadrant of the screen. There were a number of big eyes at the Faire when they saw the tiny type, still 5x7, but so much smaller.

A New Item From Perkins Engineering:

WE ARE PLEASED TO

ANNOUNCE ANOTHER ENGINEERING BREAKTHROUGH - HIGH RESOLUTION GRAPHICS. THE "HI-REZ ADD-IN" FROM PERKINS ENGINEERING USES 39 ADDITIONAL CHIPS TO EXPLOIT THE HIGH RESOLUTION CAPABILITY OF THE BALLY CUSTOM CHIPS. THE NEW CHIPS ARE ADDED TO THE BALLY MOTHERBOARD IN A WAY WHICH ALLOWS THE REGULAR CASE TO GO BACK ON. A PROTOTYPE MODIFIED BOARD WAS DEMONSTRATED AT THE COMPUTER FAIRE. HERE'S WHAT YOU WILL GET: RESOLUTION MODE IS SOFTWARE SELECTABLE AT LOW NORMAL FOR EXISTING PROGRAMS, MEDIUM (160X204, SIMILAR TO MATTEL), AND HIGH (320X204, BETTER THAN APPLE). THE 39 CHIPS INCLUDE AN EPROM FOR FIRMWARE SUPPORT OF THE NEW MODES AND 12K OF ADDITIONAL MEMORY. THE SOFTWARE MODE SELECTION ALLOWS THE INDIVIDUAL PROGRAM TO CHOOSE ITS OWN RESOLUTION FOR FULL COMPATIBILITY WITH EXISTING GAME CARTRIDGES AND BALLY BASIC. FOR BLUE RAM OWNERS, A TAPE WILL BE INCLUDED TO PROVIDE MEDIUM RESOLUTION BASIC WITH FOUR SCREEN COLORS AND 7K PROGRAMMING AREA. PRICES WILL BE IN THE RANGE OF \$250 FOR THE KIT AND \$300 WIRED (YOU SEND IN YOUR BALLY FOR MODIFICATION). AVAILABILITY WILL BE ANNOUNCED IN THE NEXT ISSUE.

CORRECTION to ALCHEMISYMMETRICAL ART (p.39) change line 30:  
IF M > 1 BC = 4                      and                      FC = RND(32)\*8+(2xC)+4



# Michigan Bally Users' Group gets a look at Zgrass-32 "add-under" for the Arcade!

by George Moses and Brett Bilbrey

For about a month we had been sending out letters to members of the Michigan B.U.G. and interested parties in neighboring states that it was time for another users' group meeting. The last one had been in October and Astrovision had sent two representatives to answer questions about their takeover of Bally's Consumer Division and to show off some of their forthcoming game cartridges. You read all about it and saw the photos in the November issue of Arcadian. For this meeting, scheduled for February 8, Dave Nutting Associates, designers of the Bally Arcade and the new Zgrass-32 had promised to send a representative out from Chicago with their amazing new computer.

News like this brings all the Bally Arcade owners out of the woodwork! The phone rang steadily for two weeks before the meeting. People had new hope. Some had purchased other computers as they tired of waiting for Bally to keep their promise to expand the Arcade. But these were the people who were most excited about this meeting! And they promised to come by the carload.

Saturday morning, February 7, the day before the meeting we went to Detroit Metro Airport and picked up Craig Anderson from Minnesota and Steve Wilson from Ohio. They came the farthest to attend. At 6 pm that evening the George Moses household was abuzz with a crowd of friends showing off software. Craig Anderson, Brett Bilbrey and Steve Wilson were doing some unimaginable things to the Arcade on George's dining room table when the doorbell rang. It was Scot Norris from Dave Nutting Associates with his wife, Cheryl looking a bit tired after a 6 hour drive. We opened the hatchback of his car and there among the luggage was the Zgrass-32. Tired or not Scot couldn't wait to plug it in and give us a little demonstration of Zgrass before dinner. He had only had a week of working with this computer prior to the meeting and wasn't fully versed in the new Zgrass language yet, but Scot was able to show us some amazing graphics on our TV screen.

Scot showed us how macros work and demonstrated the hierarchy of the Zgrass language. A macro is a program or subroutine that can run concurrently with other subroutines. The Zgrass-32 can run 127 macros at once. This is called "multi-tasking". You can call any macro, all 127 macros at once, or macros can be programmed to call each other. When you get the program running the way you want it to you can tell the computer to compile it. That is, it will rewrite the program in machine language, thus eliminating the need for the computer to interpret each command before executing it. This results in an amazing increase in speed of operation. He then demonstrated the way the Zgrass-32 can display 4 colors at once with a concentric box routine that when compiled gave a color show that had a tendency to leave one breathless. With this computer you have more screen area as no area is needed at the bottom for scratchpad. You have 102 pixels of vertical display and 160 pixels horizontally with 2 bits assigned per pixel for memory. This is the same as Bally Basic resolution except that the full 4K of memory is used for dynamic screen RAM. The entire ROM inside the Arcade is ignored and the Zgrass-32 uses its own scratchpad RAM within the keyboard so you don't need to borrow any screen RAM. Scot showed how interrupts could be used for updating graphics for smooth animation. Brett Bilbrey recently showed us this is possible with the present Arcade using machine language programming techniques he and Dave Ibach pioneered, but with this new computer it's so easy it's a snap!

Speaking of SNAP, that's the name of a new command you get with the Zgrass-32. Here you can snap an area of the screen display and store it in memory and display that image wherever and whenever you call it. You can write 6 macros that store 6 pictures of a gunfighter walking, for instance. Using multi-tasking you could display them in sequence for the visual display of an animated figure. You can also tie any figure or SNAPped image to the hand control and make it move at your command.

The self help routine was demonstrated. If you're not sure about the format of a command you just type in the name of the command and the word "HELP" and the computer will ask you for the parameters required so you don't have to grab for the instruction manual each time you begin to use an unfamiliar command. The production line prototype Zgrass units hadn't been built yet, so what we saw was still in the lab-development state. The finished prototype will have BOX, LINE, CIRCLE and POINT commands. Not many computers can draw graphics as fast or as easily as the already existing Bally Arcade. And the Zgrass-32 puts it far ahead of the rest.

The cassette tape interface is built into the computer and runs at 2000 baud. It differs from the interface we have now in that it is not a wave scanner. All it looks for is sound wave peaks and could care less what shape they're in. So it's a bit more forgiving than what we've had to tolerate in the past. The interface seemed to write more reliably to tape when the jack was plugged into the auxiliary plug than when using the mike plug.

Two RS232 ports will communicate with disc drives and printers. One thing we'd like to see is a parallel printer port that would handle a standard Centronics printer. The more expandability it has the more saleable the computer will be. The character set needs some refinement from what we saw and comments we heard at the meeting. The 3x5 pixel characters in low resolution provide 40 characters by 24 lines. Most people remarked that they would like to see higher resolution. As we remarked earlier, this was a lab-development model. More bells and whistles will be added by the time the assembly line gets cranked up. E.F. Johnson, the electronics firm in Garner Iowa is said to be gearing up for prototype production.

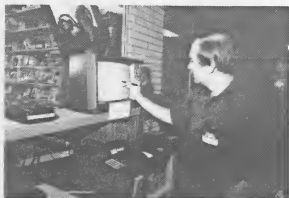


The advantages of Zgrass, a graphics language, is that the graphics handling is done by a language that was created for just that purpose. Commands for screen manipulation have been tied in with screen interrupts and display techniques so they're executed much faster and more efficiently than any TRS-80, Apple or Atari could ever hope to do. The add-on will access the custom chips in the Bally Arcade, which will facilitate moving graphics commands thru the Z80 microprocessor. Just as the Bally originally was accessible to "hacking" once we figured everything out, it looks like the Zgrass-32 will have the same ability with as many expansion peripherals attachable as possible. For instance, a parallel port, a serial port, expansion port, disc connector, and dual cassette controllers. The same foresight appears in this design that was in the Arcade's 50 pin expansion connector.

We also got a look at the science math package, a software feature that's built-in and is not common in any other computer, featuring 13 digit accuracy. Scot demonstrated the sine and cosine features and drew several concentric circles for us. The Screen Editor allows you to use the joystick to move the cursor anywhere on the screen and use the knob and trigger to insert spaces or remove characters. You can do the same thing with the keyboard using left-right and up-down arrows and you can type in corrections directly over the errors. With many computers you have to go looking for a program using addresses to find macros or information off a disc. You have to direct the flow. But the Zgrass-32 maintains all internal control to save any macros or variables on tape or disc for you in one clean sweep. In other words, it does all your housecleaning for you. The computer already has the software built in to handle multiple program storage and variable allocation with just a simple command.

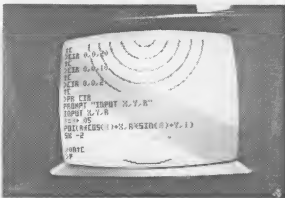
Zgrass in no way resembles Basic. It uses no line numbers. It's easy to learn. And it will write better programs for the person who wants to see the program come alive visually rather than just print text. Basic was written to teach programming to computer students. Zgrass was developed from the start to do computer graphics. You get it as standard equipment in the Zgrass-32 for only \$599.00, plus the price of your Bally Arcade that must rest on top of it (\$299.00). Everybody was amazed at what it would do for its total cost of \$898.00 (both modules together). When you compare this machine with its 32K RAM and 24K ROM with a 16K Apple II Plus that runs \$1195.00, it seems like a bargain. As the software appears on the market to make the Zgrass-32 do the things it was designed for, our impression is that it'll be an item in high demand at your local computer store.

**CRAIG ANDERSON demonstrates the lite pen he researched and built. It works amazingly well, and Brett Bilbrey wrote some software to boot the Arcade into a high speed mode to read the data as fast as the lite pen can supply it.**



**THEY'RE HIGH ON ZGRASS** - Kim Moses, George Moses (her dad), Brett Bilbrey, the Zgrass-32 Computer, Scot Norris, Dave Ibach and Craig Anderson.

**THE SUPPORT** given the Michigan B.U.G. by Ron Pollock of Tri-County Electronics in Fenton, Michigan is evidenced here. He opens the entire mall corridor and lines both walls with multi-level counters, supplies dozen of color TVs, power cords and keeps a large stock of Arcades and accessories handy for everybody.

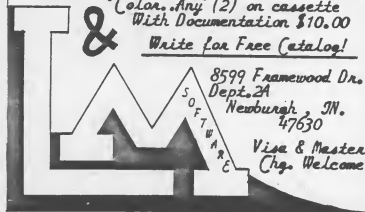


**THE CIRCLE drawing function** is shown here. Also notice the self help "PROM PT" function of the Zgrass-32. You can see some of the 3 x 5 character set displayed in this photo.

Color Organ/Light Show: Intrefaces Bally to your Stereo. Complete Unit \$29.95

18 Games are now available-All have full memory usage, lots of graphics, actions & color. Any (2) on cassette With Documentation \$10.00

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The Central and Upper Midwest Bally/AstroVision Club (CUMBAC), formed in anticipation of the "comeback" of the Bally system, is now conducting a membership drive. We've located the regional AstroVision rep and are contacting dealers as they come on the line. We've got a core group based on two years of mailing lists and correspondence, and are publishing a newsletter shortly which will be distributed by mail and in the stores (dealers) to users in Minnesota, Wisconsin, Iowa, North and South Dakota. We'll be holding an "Astrofair" in May - details to follow. Interested users please write us at:

CUMBAC  
P.O. Box 21151  
Saint Paul, Minn.

55121

- SIG BALLY -

Many thanks to Jay Fenton who made our February meeting a memorable one.

Jay met with our group before lecturing at the main CACHE meeting. During our meeting he showed us a video tape on Bally BASIC and a 7K TERSE keyboard unit. The TERSE unit was one of the several prototype add-on units. He also demonstrated three new videocades, which will be available in March; Bio-rhythms, Music Maker, and Grand Prix.

At the main meeting, Jay ran a video tape on the UV-1 Zgrass unit, shared a few of his favorite programs and discussed the Zgrass programming language. He also brought along his latest project, GORP. GORP is a commercial video arcade game in which the player tries to get through a five-episode space adventure. It also incorporates a speech synthesizer.

I've heard several interesting things about the Zgrass 32 unit. The Zgrass disk system will be compatible with the TRS-80. The 32K RAM addition is intended so that the user can run CP/M and bypass the resident ROM. Therefore, the Z80 will be addressing a full 64K RAM; the new add-on will have a built-in assembler.

USER GROUP DATA/ CHICAGO Latest word is that Rusty Blommaert and Larry Smith will be demonstrating their keyboard and memory add-on at the National Computer Congress, to be held at Mc Cormick Place, Chicago, May 4-7. They will be a part of the CACHE group exhibit.

# ARCADIAN

```

1 .MIKE PEACE PRESENTS
2 .WAVEMAKERS MEMORY          D00DLE
10 :RETURN ;FC=RND (32)b8;BC=RND (32)b8-1;CLEAR ;&(9)=255
20 A=0;B=0;PRINT ;CX=-45;NT=0;PRINT "MEMORY D00DLE
100 FOR X=49TO 56;NT=X-40;MU=X;NEXT X;FOR Z=1TO 675
110 IF &(16)A=A+JX(1)b2;B=B+JY(1)b2;GOTO 120
115 GOTO 110
120 C=(A+80)c2;@(Z)=Cb100bB+44
130 BOX A,B,2,2,3;IF TR(1)GOTO 150
140 NEXT Z
150 FOR X=75TO 60STEP -2;NT=76-X;MU=X;NEXT X;CLEAR ;:RETURN
155 FOR X=1TO Z;IF TR(1)RUN
160 A=@(X)c100b2-80;B=RM-44
170 BOX A,B,2,2,3
180 NEXT X;GOTO 155
190 FOR X=1TO 900;NEXT X;GOTO 155

```

ARCADIAN PROGRAM REWARD We are going to provide an on-going stipend to the author of the 'best program' in each issue of the ARCADIAN. I will send a tape of each issue to a group of five judges who will make some decision as to which of those programs they feel is the 'best', and the selected author will receive \$100, courtesy of AstroVision. The author will replace one of the judges on the panel, allowing for rotation of that job.

The full scheme has yet to be ironed out, and some changes may take place before we actually start, but I wanted to pass this word to you so that you could think of some programs to submit. The first programs to be reviewed under this scheme will be in issue Eight.

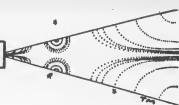
**PROGRAM POLICY** This is a reiteration of a statement made some time ago. Programs sent to me for inclusion in the newsletter are not paid for, and are assumed to be usable by all. The monthly payment scheme mentioned above will hopefully increase the volume of programs submitted. If so, we will increase the size of the publication to suit. But we always need short and simple programs that can be used by beginners to help them understand computers and the Arcade.

Computer TWIXT is based on the 3M game. The player with the square has to generate a line from one side of the playing square to the other, while the player with the cross has to work vertically. The computer will draw a line for you if your new piece is at a certain location from an existing piece. The two-over-and-one-across requirement is illustrated (the 2:1 can be in any direction, or 1:2):

The computer will tell you if your wall extends across the playing square. Use TR(1) to start a new game.



# ARCADIAN



```

1 .
2 .
3 .
4 .
5 .COMPUTER TWIXT
6 .BY JOE PIPEK 8-80
10 @(1)=2;@(2)=1;@(3)=-1;@(4)=-2;@(5)=-2;@(6)=-1;@(7)=1;@(8)=2
20 @(11)=1;@(12)=2;@(13)=2;@(14)=1;@(15)=-1;@(16)=-2;@(17)=-2;@(18)=-1
30 @(22)=1;@(23)=1;@(24)=2;@(25)=3;@(26)=3;@(27)=3;@(28)=4;@(29)=5;@(30)=5
40 U=39;CLEAR ;FOR Y=-UTO USTEP 6;FOR X=-UTO USTEP 6;BOX X,Y,1,1;NEXT X;NEXT
Y
80 BOX U,U,1,1,3;BOX U,-U,1,1,3;BOX -U,U,1,1,3;BOX -U,-U,1,1,3
90 CY=22;CX=-68;TV=49;A=-52;B=22;GOSUB 500;CX=52;TV=50;A=68;GOSUB 400
110 CY=30;CX=-64;TV=95;CX=-57;TV=97;CY=18;CX=62;TV=96;CY=25;CX=62;TV=94
130 D=0;A=3;B=3;W=0
140 D=(D=1)+1
150 CY=0;CX=-68+(D=2)*120;TV="↑";CX=-68+(D=1)*120;TV=" "
170 A=6bJX(D)+A;B=6bJY(D)+B;IF A<-33A=-39b(D=1)-33b(D=2)
200 IF A>33A=39b(D=1)+33b(D=2)
210 IF B<-33B=-39b(D=2)-33b(D=1)
220 IF B>33B=39b(D=2)+33b(D=1)
230 BOX A,B,3,3,3;BOX A,B,3,3,3;IF TR(D)=1 IF PX(A,B)=1GOTO 260
250 GOTO 170
260 GOSUB 500-(D=2)*100;IF (ABS(A)=39)+(ABS(B)=39)W=1
280 IF W=1C=0;P=A;R=B;K=3;Q=3;H=1;GOSUB 1020
290 GOTO 140
400 BOX A,B,3,1,1;BOX A,B,1,3,3;GOSUB 600
460 RETURN
500 BOX A,B,3,3,3;GOSUB 600;RETURN
600 FOR E=1TO 8;X=A+@(E)*6;IF X<-39b(D=1)-33b(D=2)GOTO 690
630 IF X>39b(D=1)+33b(D=2)GOTO 690
640 Y=B+@(E+10)*6;IF Y<-39b(D=2)-33b(D=1)GOTO 690
660 IF Y>39b(D=2)+33b(D=1)GOTO 690
670 IF ABS(A)=39IF ABS(B)=39GOTO 690
680 IF PX(X,Y)*1IF PX(X+1,Y+1)=PX(A+1,B+1)H=30;Q=0;GOSUB 810
690 NEXT E;RETURN
810 FOR S=22TO H;IF X-A=12P=S-20
830 IF X-A=-12P=20-S
840 IF X-A=6P=0(S)
850 IF X-A=-6P=-0(S)
860 IF Y-B=12R=S-20
870 IF Y-B=-12R=20-S
880 IF Y-B=6R=0(S)
890 IF Y-B=-6R=-0(S)
900 BOX A+P,B+R,1,1,3;IF Q=1IF S=HRETURN
910 IF Q=1NEXT S
920 IF PX(A+P,B+R)=0Q=1;H=S;GOTO 810
930 NEXT S;RETURN
1020 IF K+Q=0GOTO 1100
1025 FOR S=HTO H+7;M=S-8b(S)*8;L=P+0(M);O=R+0(M+10)
1030 BOX L,0,1,1,3;BOX L,0,1,1,3
1070 IF PX(L,0)=1P=P+0(M)*6;R=R+0(M+10)*6;H=M-3b(M)*3+5b(M)*4;GOTO 2000
1080 IF C=0IF S>7RETURN
1090 NEXT S;RETURN
1100 CX=(D=2)*48-(D=1)*679;PRINT "WINNER"
1990 IF TR(1)GOTO 10
1995 GOTO 1990
2000 IF C=0Z=M+1
2010 IF Z>9RETURN

```



## VIPER (Video Image Processing Equipment Rack) SYSTEM

The System One contains one 16K RAM card, one bus interface card, one VIPER One cabinet (aluminum), one card rack, one +/- 5 volt and +12 volt power supply (fused), one VIPER to Bally 50-pin bus cable, one switched AC outlet, one on/off indicator switch.

The System Five contains 16K RAM card, VIPER system interface card, heavy duty +/- 5 volt and +12 volt system power supply (fuse protected), one VIPER Five cabinet, one VIPER to Bally 50-pin bus cable, one five-slot motherboard with gold plated connectors, three status indicator tri-color LEDs, one VIPER keyboard input, one 5-slot card rack with guides and fan mount (fan optional), one switched AC outlet, one on/off indicator switch.

System Ten contains the System Five plus one VIPER Ten cabinet, one extra five-slot motherboard with gold plated connectors, one extra five-slot card rack with guides and fan mount (fan optional), one extended 44-pin VIPER to VIPER bus cable, one on/off indicator LED.

The VIPER System keyboard is a 62-key unit that is ASCII-coded, upper and lower case letters, two user-defined keys, parallel to serial VIPER interface card (this interface card is adaptable to other keyboards), one aluminum cabinet, one coiled cable with DIN connector, one status indicator LED.

VIPER Interface card details: This card contains the following: eight I/O ports to control system operations, a 1K ROM monitor that is socketed to allow easy upgrading to a 4K ROM, a 12-2400 baud audio cassette interface with programmable speed selection, one keyboard input port for the VIPER keyboard, one memory management system to allow up to 128K bytes of RAM expansion, one independent 5-watt audio amplifier with volume control with 8 ohm speaker output and two pre-amp outputs, one audio dubbing-recording mode for mixing program tapes with voice, music, and sound effects, audio sampling/ and detecting in two frequency ranges for elaborate audio/visual synchronization. Also includes address, data, and control line buffers and bus inputs from computer expansion port.

VIPER RAM card details: This card is a 16K addressable RAM board in 4, 8, or 16K blocks. It is designed with the Interface card for extended memory addressing up to 128K bytes (use up to 8 RAM boards), multifunction 8-position switch pack for enabling and disabling Bally memory areas, and on-board clock select.

All printed circuit boards are of the highest quality, with plated-thru hole integrity throughout. All boards are fully socketed with gold plated sockets, and all connectors and fingers are gold plated.

Prices - all units are assembled and tested. The basic RAM board and System One will be available 1 May

System One	200.
16K board	135.

The remainder of the units will be available 31 May

System Five (w/o RAM)	200.
System Five (+ 16K)	395.
System Ten addition	150.
Keyboard addition	145.
Parallel to Serial board	45.

## ADS

For Sale: Blue Ram with documentation and software \$125; Cartridges: Clowns/Baseball/Football at \$15 each; Seewolf and Maze at \$12 ea. All in perfect shape. Robert Jaeger, 58 Millay Rd., Morganville, NJ, 07751.

Super Software now offers all Videocades and Arcade units at low discount prices. All 29.95 Videocades are 25. All Arcades (including the new BASIC cartridge) are 260. We also offer a full line of programs for the Bally Arcade. For information, write Super Software, 44 Forestbrook Dr. North Plainfield, NJ 07060

SALVAGERS Trade good U-17 (Custom Address) for good U-18 (Custom Data). Also need one-chip ROM (reasonable) Richard Dermody, 8431 Timber Glen, San Antonio, TX 78250

FOR SALE Bally Professional Computer. Almost new, just used a few times. Two controllers. \$250 or best offer. Submit all offers Philip Lowe, 12611 Presnell St, Los Angeles, CA 90066

Complete modification kit for your Arcade- \$8.00; Assembled and tested Kludge, \$10.00 (extra parts needed included with both) Add \$25 for new Data chip- and \$1 for postage and handling. Barry Ellerson 5017 River Rd., Schiller Park, IL, 60176  
(story and schematic in next issue)

Bally factory games and accessories - special discount to ARCADIAN subscribers. For free price list, write to SFP, 1064 N. Alta Ave., Dinuba, CA 93618

The following tape (\$7.95 + .50 post) is one of many available from WAVEMAKERS, Box 94801, Schaumburg, IL 60193. Write for their catalog.

### PROGRAM TAPE #2

SIDE 1 CLUE - BASED ON THE MILTON BRADLY GAME. YOU INPUT NUMBER OF PLAYERS (DETECTIVES). YOU GET A CHOICE OF TWO ROOMS TO GO TO OR YOU CAN TAKE A CHANCE AND GET IN A ROOM NOT SHOWN. YOU CHOOSE THE WEAPON FROM THE ON-SCREEN LIST. THE COMPUTER TELLS YOU ONE OF THE FOLLOWING, WRONG SUSPECT, WRONG ROOM OR WRONG WEAPON. YOU MUST USE DEDUCTIVE REASONING TO COME UP WITH THE RIGHT COMBINATION AND SOLVE THE CRIME. THERE ARE NO GRAPHICS BUT THIS ADDS UP TO HOURS OF FUN. CAN BE PLAYED BY ANY NUMBER OF PLAYERS.

SIDE 2 FLYING ACE FOR (1) OR (2) PLAYERS THIS GAME PUTS YOU IN THE COCKPIT OF A FIGHTER PLANE CHASING AND SHOOTING AT THE ENEMY. YOU MUST SHOOT THE ENEMY DOWN QUICKLY TO GET THE HIGHEST SCORE. CHALLENGING GAME WHEN PLAYED WITH A GOOD OPPONENT.

70

## ARCADIAN

Robert Fabris, Hyperactive  
3626 Morrie Dr.  
San Jose, CA, 95127

(The SOURCE TCD959)

<b>BULK RATE</b> U. S. POSTAGE <b>PAID</b> Sunnyvale, CA Permit No. 931
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**FIRST CLASS**

**\$100 ARCADIAN PROGRAMMING CONTEST** As announced in the last issue, we are starting a monthly contest which will provide the winner with \$100, courtesy of AstroVision. The basis of the contest will be the judges' decision as to which is the best program in that particular issue. Rules are minimal, and there are practically no restrictions. We do want these programs to be original with the author, so we are asking that you so state with your submission. There will be five judges, and in the beginning the following volunteers will preside: Craig Anderson, Dave Ibach, George Moses, Al Rathmell, and Dick Strauss. One of these will drop out each month as a winner takes his place, and then the monthly winner will replace the most senior judge. In this way, the team of judges will always be rotating, and the winner will be out of circulation for a bit.

A week prior to the date that the ARCADIAN is scheduled for the printer, those programs to be included will be sent to the judges. That day also starts the next cycle of program input for the subsequent issue.

Each judge will grade each program relative to the others on a 1 - 10 basis. These scores will quickly be returned to me and tallied - highest score wins. The winner will be announced in that issue, and a check for \$100 sent with his/her copy. Each issue will therefore stand on its own, no carryovers, no delays.

When you submit a program that you would like considered for the contest, please send along a statement "I certify that the program titled '---' is the product of my own efforts and is not a copy of an available program, signed-----"

Programs that are translations, etc., are still needed for the Arcadian, but would not be eligible for the contest. !

**LATEST NEWS:** ASTROVISION BASIC, to be provided free with all new Arcade units (box will read ARCADE PLUS), was approved and sent to be manufactured on April 14. Should be 8-10 weeks for delivery. The data transfer rate has been increased to 2000 baud. The method of transmission has been changed, which is why a standard tape recorder can still be used. We will be able to load our old, 300 baud tapes into the new Basic. Then those programs can be dumped to tape via the new interface jack at 2000 baud. For the "Hackers" out there who want to experiment, we'll have the disassembled listing with comments, for \$7 ppd (AstroVision BASIC listing), and also a description of all new commands with comparisons to Bally Basic (20 pages) for \$2.50 ppd (AstroVision BASIC Guide). We'll be covering the new commands and features in tutorials in the ARCADIAN, of course.

Obviously, those who seriously wish to continue selling programs will have to provide them in both formats. This leads me to advising you that we will support all versions of the languages used in the Arcade, and we'll have to make some changes in the ARCADIAN to be able to handle everything. At the moment, we'll be indicating which Basic a program is written in by the notations "BB" for Bally Basic, "AB" for AstroVision Basic, and "XB" for Extended Basic.

**MOTHERBOARD MODIFICATIONS** The following changes are recommended if your machine has any of the listed symptoms. The author, Barry Ellerson, has sent us some "inside information", and can provide a small, built-up addition, ready for installation. Check his ad on p.80

If your unit has these symptoms: Screen Tearing, Loss of Horizontal Sync. on warm-up, Unit goes Dead - or keeps Resetting after warm-up, then the following modifications will correct them. If your unit went completely dead following these symptoms, these modifications will probably repair it.

## NECESSARY MODIFICATIONS

1. Replace 74LS74 (U-16, Clock) with 74S74.

2. Replace Driver 75361 (U-32, 8-pin, clock) with Kludge board assembly. NOTE: Be sure to heat pins enough to cause solder to flow around double sided foils, as there is no way to see if there is a good connection once the board is in place. Remove crystal - extend leads - cover w/spaghetti or heat shrink tubing - place suitable insulating material over board to prevent crystal from shorting points on top of the board - Lay crystal flat back over top of Kludge board. CAUTION! Use extreme care when removing 75361 driver. If plated through holes are pulled out during removal, repair by pushing thin wire through bottom of board, bend over, and solder to top foil. Then install and solder Kludge assembly. Cut off excess wire on bottom.

3. Remove resistor and capacitor (see diagram), and place jumper where capacitor was. (These units may not exist on your board, or this may have been done by the factory.)

4. Jump 27 ohm resistor R-1 (10v supply, 1w) with a 47 ohm resistor, 1/4 watt or larger.

5. If you have a grey colored data chip (under the keypad), this old style unit which can cause further problems with the clock, DMB1LS95, and/or memory should be replaced with a new version (black color) and properly heat sunk, after cutting a hole in the top shield.

6. Replace 82 ohm resistors in clock (R-12,13) with 47 ohm resistors.

## OTHER MODIFICATIONS USEFUL BUT NOT ABSOLUTELY NECESSARY

1. Put in jumper wire from cathode of CR-3 to "+" end of C-6.

2. If C-19 (I/O) is glass, orange and black, replace.

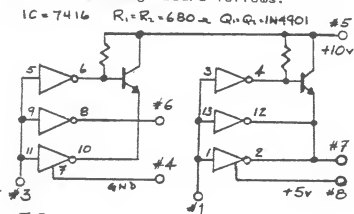
3. Check front edge of key pad and file off any protruding leads.

4. If line filter (in metal box 1"x2") is high resistance type (no tape, or not toroid) replace with new style, low resistance.

5. Put hot melt wax on base of key pad.

6. Replace CR-3 to -6 with schottky 1N5817 or equivalent.

The wiring schematic for the Kludge board follows.





# ARCADIAN

## PRECAUTIONS

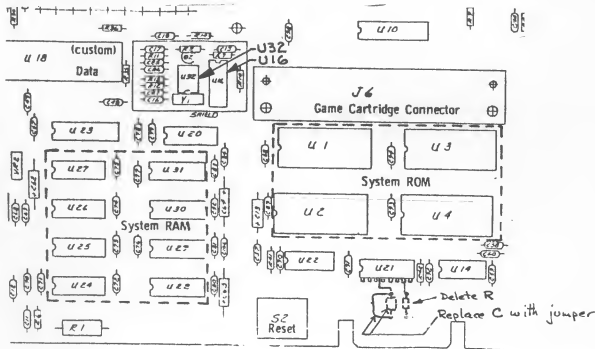
1. Do not wear nylon clothes. Work in a static-free environment, preferably grounded.

2. If the unit is operated outside of its case, short across C-6 before further handling. Inadvertent shorting to other points on board could blow components.

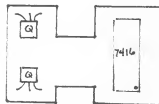
3. Check to be sure metal bushings in bottom shield pan do not short across any foils.

4. Check on-off switch for center lead that extends beyond board edge as it could short to the shield pan.

5. Check 5v. heat sink for good mechanical contact and check clearance of spring clips and board foils.



Full size pc board of Kludge:



```

3 .
4 .
5 . STRAIGHT LINES
6 . JIM DUNSON 12/78
7 .
10 CLEAR ; T=0; NT=0; N=0; FC=BC-1; BC=RND (32)*8; S=RND (20)+10; R=RND (3); C=R
20 M=X; GOSUB 40; GOSUB 50; N=X; GOSUB 40; GOSUB 50; T=T+1; IF T=SFOR D=1 TO 1000; NEXT
D; GOTO 10
30 GOTO 20
40 X=RND (14)-7; RETURN
50 A=M*9; B=N*6; IF R=2 C=RND (3)
60 LINE A,B,C; RETURN

```

ALTERNATIVE ENGINEERING regrets to announce a delay of the VIPER system. However we are glad to announce that the delay is due to the addition of a keyboard interface to the VIPER System One and an additional feature to the 16 K RAM board.

The RAM board will now allow you to load the new Extended Basic 8K tape into the RAM and use the other 8K in which to run programs. Once loaded, you can run either Extended Basic or Bally Basic because they are compatible. You can even load Bally Basic programs while running your Extended Basic and when you execute the old program it will run 4 - 6 times faster.

The System One Interface Card will now include the same VIPER keyboard input port as the System Five. The two systems will be software and hardware compatible. We wish to thank everyone for their continued interest in the VIPER System. Adding these features at this late stage was a hard decision to make but because we want to give you the Extended Basic on tape and a port for a keyboard we think that this delay will be worth it. The revised price of the System One will be \$225, only \$25 more than it was without the keyboard port, automemory write-protect circuit, or the Extended Basic tape.

Alternative Engineering, P.O.Box 128, Gardiner, ME 04345  
(207) 622-5205 (207) 582 6327

Editorial Notes- After a number of inquiries came in as a result of last month's ad, the Alternative Engineering designers decided that there was enough demand for a keyboard interface at the System One level. In addition, they had to ensure that if the Extended Basic was loaded into half of the available memory, that there was no chance of it's being lost while a program was being set up or run in the other half. The System One card requires two additional chips to do this, and the rework to the printed circuit board is causing a delay of 4 to 6 weeks. The prototype has been operating, and Bally Basic programs have been loaded into Extended Basic and since screen memory is no longer utilized, the programs operate much faster. The Introductory Prices, stated on page 61, are still in effect except for System One, which is now \$225 (and includes the Extended Basic).

SUB HUNT - YOU COMMAND THE DESTROYER IN AN ATTEMPT TO LOCATE AND DESTROY THE ENEMY SUBMARINE FLEET. FIRST, YOU WILL BE ASKED WHAT THE WINNING SCORE SHOULD BE. ENTER THIS THROUGH THE KEYBOARD. THIS IS A ONE PLAYER GAME AGAINST THE COMPUTER. A COMPUTER SUB IS SUBMERGED SOMEWHERE ON THE GRID. ON EACH TURN HE WILL EITHER MOVE OR FIRE TORPEDOES. IF HE FIRES, HE MUST REVEAL HIS LOCATION. YOU USE THE JOYSTICK TO CONTROL YOUR MOVEMENT, UP, DOWN, RIGHT, LEFT, OR DIAGONAL. AFTER YOU TWEAK THE TOP, A LOUD BEEP IS HEARD. NOW COUNT "ONE SUBMARINE, TWO SUBMARINES, ETC" UNTIL A SOFTER BEEP IS HEARD. THIS REPRESENTS THE DISTANCE TO THE SUBMARINE. SONAR!! NOW YOUR CREW FIRES DEPTH CHARGES INTO THE TWO SQUARES IN FRONT OF YOU. MOVE AGAIN. GOOD LUCK.

```

1 .
2 .
3 .
4 .
5 . SUB HUNTER
6 . BY BOB WISEMAN
10 CLEAR ;GOSUB 9000
20 GOSUB 1000;GOSUB 2000
30 GOTO 20
1000 U=C;V=D
1010 L=JX(1);M=JY(1);N=TR(1)
1020 IF L=0IF M=0IF N=0GOTO 1010
1040 NT=30
1045 H=ABS(D-F)+ABS(C-E)
1050 MU="Q";FOR I=1TO 500bH;NEXT I
1060 NT=4;MU="Q";NT=0
1070 FOR I=1TO 400;NEXT I
1100 IF (C+L<1)+(C+L>7)+(D+M<1)+(D+M>5)GOTO 1800
1110 C=C+L;D=D+M
1120 X=C;Y=D;GOSUB 8300
1130 X=X+L;Y=Y+M
1140 IF (X<1)+(X>7)+(Y<1)+(Y>5)GOTO 1200
1150 GOSUB 8300
1200 X=U;Y=V;GOSUB 8200
1210 GOSUB 8000;GOTO 1990
1800 NT=10;MU="$";MU="X";NT=0;GOTO 1010
1990 RETURN
2000 IF RND (10)>7GOTO 2500
2010 L=RND (3)-2;M=RND (3)-2
2015 IF L=0IF M=0GOTO 2010
2020 X=E+L;Y=F+M
2030 IF (X<1)+(X>7)+(Y<1)+(Y>5)GOTO 2010
2040 E=X;F=Y;GOTO 2990
2500 H=7;I=1
2510 IF C<E H=1;I=-1
2520 Y=F
2530 FOR X=ETO HSTEP I
2540 GOSUB 8700;NEXT X
2990 NT=100;MU=99;NT=0
3000 RETURN
8000 CX=10bC-40
8010 CY=10bD-30
8015 PRINT "a";RETURN
8200 GOSUB 8900;PRINT " ";RETURN
8300 GOSUB 8950
8340 IF X=EIF Y=FGOTO 8400
8350 GOTO 8690
8400 S=1;GOSUB 9500
8410 E=RND (7);F=RND (5)
8690 GOSUB 8200;RETURN
8700 GOSUB 8900
8705 &(23)=50
8710 &(21)=50;&(20)=255;NT=1
8720 IF X=CIF Y=DGOTO 8800
8730 PRINT " ";&(21)=0
8731 NT=0
8735 &(23)=200;&(20)=0
8740 GOSUB 8200;GOTO 8890
8800 NT=0;&(23)=200;&(20)=0;&(21)=0
8805 GOSUB 8950
8810 T=1;GOSUB 9500
8820 GOSUB 8200;C=1;D=3
8830 GOSUB 8000
8840 X=H+I
8890 RETURN
8900 CX=10bX-40
8910 CY=10bY-30
8920 RETURN
8950 &(21)=255;GOSUB 8900
8960 PRINT " ";&(21)=0
8990 RETURN
9000 NT=0;PRINT ;PRINT ;PRINT "SUB HUNTER";PRINT
9005 &(23)=200
9010 INPUT "ENTER # OF GAMES" G
9020 CLEAR ;FC=134;BC=169
9025 A=0;B=0;S=0;T=0
9030 FOR X=-25TO 25STEP 10
9040 BOX 0,X,71,1,1;NEXT X
9050 FOR X=-35TO 35STEP 10
9060 BOX X,0,1,51,1;NEXT X
9070 C=1;D=3;E=7;F=3
9080 GOSUB 8000
9100 RETURN
9500 CX=-75;CY=-40
9510 IF SPRINT "GOOD SHOT ",
9520 IF TPRINT "YOU ARE SUNK",
9530 CX=-75;CY=40
9540 A=A+S;B=B+T;S=0;T=0
9550 PRINT "SHIP=",#2,A," SUB=",#2,B,
9552 CX=-75;CY=-40
9554 FOR N=1TO 1000;NEXT N
9556 PRINT "
9560 IF A<GF B<GRETURN
9600 CX=-75;CY=-40
9610 IF A=GPRINT "GOOD JOB CAPTAIN",
9620 IF B=GPRINT "YOU ARE DESTROYED",
9630 STOP

```

Bob Wiseman  
118 St. Andrews Dr.  
Cincinnati, OH 45245

# ARCADIAN

```

1 :RETURN ;E=9000;F=1000;H=2000;I=7000;J=5000;L=3000;O=8000;P=4000
10 CLEAR ;BC=RND (256);FC=BC+4;S=4;B=32767;W=60;GOSUB 10000;CLEAR ;GOSUB F;Q=3
0;A=0;GOSUB H;V=A
15 CY=40;PRINT "POPULATION = ",#1,A," ,000
20 R=0;W=W-20;IF A<99CY=-25;PRINT "YOU LOSE!";GOTO I
30 PRINT "YOU HAVE ",#1,Q," MISSILES";PRINT "ENEMY HAS ",#1,Sb5," MISSILES";B=
A;FOR Z=1TO H;NEXT Z
35 IF S=0IF V-B<100CY=-25;PRINT "YOU WIN";GOTO I
40 IF S=0CY=-25;PRINT "YOU LOSE!";GOTO I
50 BOX 0,10,160,67,2;PRINT "***** ENEMY ATTACK *****";&(16)=49;&(17)=243;&(1
8)=244;&(19)=245;&(21)=15;NT=0
60 &(22)=255;&(23)=10;FOR Z=1TO H;NEXT Z;BOX 0,10,160,67,2;GOSUB L;Y=W;FOR Z=1
TO 5;BOX @(Z),Y,1,3,3;NEXT Z
65 Y=Y-1;&(16)=Y+74;FOR Z=1TO 5;IF @(Z)=0GOTO 100
70 IF PX@(Z),Y-1,NT=0;GOSUB O
80 IF PX@(Z),Y)=0@(Z)=0;GOTO 100
90 BOX @(Z),Y-1,1,1,1;BOX @(Z),Y+2,1,1,2
100 NEXT Z;IF Y<-38GOSUB P;GOTO 140
110 IF TR(1)IF R=0IF Q>0Q=Q-5;R=1;GOSUB P;N=-30;FOR M=6TO 10;BOX @(M),N,1,3,3;N
EXT M
120 IF R=1GOSUB J
130 GOTO 65
140 A=0;GOSUB H;IF B-A=0CY=0;PRINT "NO LOSSES";GOTO 160
150 CY=0;PRINT #1,B-A," ,000 KILLED
160 S=S-1;GOTO 15
1000 BOX 0,-42,160,3,1;FOR G=-80TO 79STEP 3;BOX G,-38,RND (5),3+RND (6),1;FOR N=
1TO 2
1010 BOX G,-32-RND (9),1,RND (2),2;NEXT N;NEXT G;RETURN
2000 GOSUB E;BOX 0,5,160,75,2;CY=40;PRINT "COUNTING POPULATION
2010 FOR Y=-37TO -34;FOR X=-80TO 79;IF PX(X,Y)A=A+1
2020 MU=A;NEXT X;NEXT Y;IF A>B A=B
2030 NT=0;RETURN
3000 FOR Z=1TO 5
3010 A=RND (150)-75;FOR C=1TO 5;IF @(C)=A)+(A=0)GOTO 3010
3020 NEXT C;@(Z)=A;NEXT Z;RETURN
4000 FOR Z=6TO 10
4010 A=RND (150)-75;FOR C=6TO 10;IF @(C)=AGOTO 4010
4020 NEXT C;@(Z)=A;NEXT Z;RETURN
5000 N=N+1;FOR M=6TO 10;IF PX@(M),N)=0GOTO 5030
5005 IF JX(1)BOX @(M),N-1,1,3,3;@(M)=@(M)+JX(1);BOX @(M),N-1,1,3,3
5010 BOX @(M),N+1,1,1,1;BOX @(M),N-2,1,1,2
5020 IF N>Y&(21)=255;&(16)=1;BOX @(M),N,9,9,1;BOX @(M),N,9,9,2;FOR D=1TO 500;NE
XT D;&(16)=Y+74
5030 IF N>Y+1R=0
5040 NEXT M;&(21)=15;RETURN
7000 CY=40;PRINT "ORIGINAL POP. = ",#1,U," ,000
7010 PRINT "TOTAL LOSS = ",#1,U-A," ,000";PRINT "PRESS ANY KEY TO PLAY AGA
IN";IF KPRUN
8000 &(21)=255;&(16)=0;FOR D=1TO 7
8010 BOX @(Z),Y,D,D,1;NEXT D;BOX @(Z),Y,9,9,2;FOR D=1TO F;NEXT D
8015 IF Y>-37&(22)=15;RETURN
9000 &(21)=0;&(22)=0;&(23)=0;NT=1;RETURN
10000 PRINT " STRATEGIC AIR COMMAND";PRINT ;PRINT "IF LOSS OF LIVES FROM";PRINT
"ATTACK EXCEEDS 100,000,
10010 PRINT "YOU LOSE! TO DEFEND GOTO TR(1)&(KN(1)";FOR Z=1TO L;NEXT Z;NT=1;RET
URN

```

Bob Weber  
6594 Swartout Rd.  
Algonac, MI 48001

# ARCADIAN

```

1 :
2 .
3 .CIRCLES
5 .BY RON PICARDI
10 CLEAR
20 PRINT ;PRINT ;PRINT
30 PRINT " ALL CIRCLES"
40 PRINT
50 PRINT " POP ART"
60 GOSUB 1000
65 FC=BC
66 BC=15
70 FOR A=1TO 150
80 X=X+1
90 GOSUB 1100
100 NEXT A
105 GOSUB 1000
110 FOR A=1TO 75
120 X=X+2
130 GOSUB 1100
140 NEXT A
150 GOSUB 1000
160 FOR A=1TO 50
170 X=X+3
180 GOSUB 1100
190 NEXT A
200 GOSUB 1000
210 FOR A=1TO 25
220 X=X+6
230 GOSUB 1100
240 NEXT A
250 FOR A=1TO 500
260 NEXT A
270 GOSUB 1200
280 FOR A=1TO 80
290 Y=Y+1
300 GOSUB 1300
310 NEXT A
320 GOSUB 1200
330 FOR A=1TO 40
340 Y=Y+2
350 GOSUB 1300
360 NEXT A
370 GOSUB 1200
380 FOR A=1TO 20
390 Y=Y+3
400 GOSUB 1300
410 NEXT A
440 GOSUB 1000
450 Y=3;C=2
460 GOSUB 1400
470 GOSUB 1500
480 Y=6;C=3
490 GOSUB 1400
500 GOSUB 1500
510 Y=10;C=4
520 GOSUB 1400
530 GOSUB 1500
540 Y=15;C=5
550 GOSUB 1400
560 GOSUB 1500
570 Y=21;C=6
580 GOSUB 1400
590 GOSUB 1500
600 Y=28;C=7
610 GOSUB 1400
620 GOSUB 1500
630 Y=36;C=8
640 GOSUB 1400
650 GOSUB 1500
655 Y=36;C=8
656 X=0;B=0
660 FOR A=1TO 40
670 LINE 0,0,0
680 IF X>0C=C-1
690 IF X<0C=C+1
700 IF Y>0B=B-1
705 X=X+C
710 IF Y<0B=B+1
715 Y=Y+B
720 LINE X,Y,1
730 &(17)=Xb3;&(18)=Yb3
740 NEXT A
750 GOSUB 1500
760 CLEAR ;&(22)=255
770 X=0;Y=32;B=0;C=10
780 FOR A=1TO 370
790 IF X>0C=C-1
800 IF X<0C=C+1
810 IF Y>0B=B-1
820 IF Y<0B=B+1
830 X=X+C;Y=Y+B
840 BOX X,Y,2,2,1
850 &(17)=Xb3;&(18)=Yb3
860 NEXT A
870 GOTO 2000
1000 FOR A=1TO 500
1001 NEXT A
1002 CLEAR
1003 &(22)=255
1010 X=-75;C=0;Y=0
1015 &(22)=255
1020 LINE -75,0,0
1025 FC=RND (32)b8-2;BC=RND (32)b8+2
1030 RETURN
1100 &(17)=Y;&(18)=-Y
1110 IF Y>0C=C-1
1120 IF Y<0C=C+1
1130 Y=Y+C
1140 LINE X,Y,0;LINE -X,-Y,1
1150 RETURN
1200 FOR A=1TO 500
1201 NEXT A
1202 CLEAR
1203 &(22)=255
1210 X=0;Y=-40;C=10
1220 FC=RND (32)b8-2;BC=RND (32)b8+2
1225 LINE X,Y,0
1230 RETURN
1300 &(17)=X;&(18)=-X
1310 IF X>0C=C-1
1320 IF X<0C=C+1
1330 X=X+C
1340 LINE X,Y,0;LINE -X,-Y,1
1350 RETURN
1400 X=0;B=0
1405 LINE X,Y,0
1410 FOR A=1TO 40
1420 IF X>0C=C-1
1430 IF X<0C=C+1
1440 IF Y>0B=B-1
1450 IF Y<0B=B+1
1460 X=X+C;Y=Y+B
1470 &(17)=Xb2;&(18)=Yb2
1480 LINE X,Y,1
1490 NEXT A

```

Ron Picardi  
630 Bacon Rd.  
Saginaw, MI 48603

MEMORY MAP - AstroVision Basic: As of the date of printing, the various allocations of memory space in the available 4K are as indicated below. We printed a similar map for the original Bally Basic in Vol 1, p.34, and areas obviously different are indicated by an asterisk (\*).

On Board ROM Area	0 - 8191	0 - 1FFF
BASIC ROM Area	8192 - 12287	2000 - 2FFF
Screen Memory Area	16384 - 20479	4000 - 4FFF
Graphics/Program Area	16384 - 19983	4000 - 4E10
Scratchpad Area	20000 - 20463	4E20 - 4FEF
*Variables start at	20002	4E22
*Stack Area	20258 - 20415	4F22 - 4FBF
*Line Input Buffer	20154 - 20257	4EBA - 4F21
Text Array Area	-24576 to -22777	A000 - A70C

MACHINE CODE MYSTERY We've had very few machine code programs for you, and I believe part of the problem has been the awkward entry of values. The following program by Al Rathmell makes the machine do all the work of swapping pairs of hex code, converting them to decimal, and POKEing them into memory slots.

```

1. HEX POKER
2. BY AL RATHMELL
10 CLEAR: INPUT "START ADDRESS = " B
20 PRINT #2, B, "=",
30 FOR A = 1 TO 2: K = KP: TV = K: IF K = 112 TV = 13: STOP
40 GOSUB 90
50 IF A = 1 J = K x 16
60 IF A = 2 K = J + K
70 NEXT A: %(B) = K: B = B + 1
80 PRINT #6, K: GOTO 20
90 IF (K < 48) + (K > 70) GOTO 20
100 IF K > 57 IF K < 65 GOTO 20
110 K = K - 48: IF K > 9 K = K - 7
120 RETURN

```

This program was typed directly, and therefore the small 'x' means to "multiply".

The HEX POKER program is a small utility routine that will store hexadecimal Z80 Opcodes into memory one byte at a time. The starting address is entered in decimal (such as using 20180, the Bally Basic line buffer starting location - note that it is 20154 in the AstroVision Basic - rf). This is identified as variable "B". As each memory location is listed on the screen by this program, enter a two-digit hex code from the keypad. After the last byte, key in WORDS RETURN. To run the machine code routine, enter CALL B where "B" was the starting address. . .

Al Rathmell, 1643 Swallow Dr., Sunnyvale, CA 94087

**EXTENDED BASIC** We expect to make this new language available in two versions: on tape, for those of you who will have a lot of added memory; and on a ROM for those of you with a small added memory. To explain: The Extended Basic resides in 8K bytes. If you have lots of memory available to you, then you can afford to allocate 8K of that memory exclusively for the storage of the Basic, and use the rest of your memory for inventing a program that utilizes that Basic. If you had 24K of memory, for example, 8K would be language, and 16K could be program. You would have to load the Basic every time you wanted to use it. It is the cheaper way to obtain the Basic.

If you have a limited amount of memory, then you want to keep as much of it available for writing programs. That person can purchase the Basic permanently located in a ROM chip, exactly as the Bally Basic is now. It would be inside a cartridge and would fit into the existing receptacle just like the Bally Basic does. The language will be the same and programs will run equally well in either memory system (as long as the program fits).

Here is a list of most of the new commands and features that will appear in the Extended Basic:

## POINT and CIRCLE

SNAP memorizes what is on the screen and stores it in an array. Later you can recall the scene using SHOW

NEW erases the program

DEFAULT sets all variables to their original values.

ZERO sets all variables to zero.

DATA allows easier entry of variables

SCROLL rolls the text up or down a specified number of lines

Commands can be shortened (P. means PRINT)

Conversion is available between decimal and hex and binary

Four colors anywhere

Additional character font size of 3x5

A window can be set up of any size, anywhere, within which text can be placed and scrolled.

**UNUSUAL SOUNDS** The following program was sent by Bill Loos, which, along with the list of variables, will provide some unusual sound effects. Make direct substitutions of the values of X and Y as recommended, either individually, or by grouping two or more together.

10 INPUT X; INPUT Y; &(21)=15	X = -255	Y = -224
20 FOR A=X TO Y	X = -223	Y = -192
30 &(19) = A; &(18) = A	X = -191	Y = -160
40 &(20) = ABS(2xA); NEXT A	X = -159	Y = -128
50 FOR B = 0 TO 500; NEXT B	X = -127	Y = -96
60 &(18) = 0; &(19) = 0; &(20) = 0	X = -95	Y = -64
70 GOTO 10	X = -63	Y = -32
	X = -31	Y = -1

Bill Loos, 8599 Framewood Dr. Newburgh, IN 47630

# ADS:

## PROGRAM TAPE #3

SIDE 1 MAZE RACE & OBSTACLE COURSE - BOTH GAMES ARE LOADED AT THE SAME TIME:  
MAZE RACE IS A TWO PLAYER GAME REQUIRING EACH PLAYER TO RACE THROUGH A MAZE WITHOUT TOUCHING A WALL. IF YOU TOUCH A WALL YOU LOOSE POINTS PLUS BLOW A HOLE IN IT WHICH YOUR OPPONENT CAN USE TO HIS ADVANTAGE.

OBSTACLE COURSE IS PROBABLY OUR MOST POPULAR GAME SO FAR. IT REQUIRES A GREAT DEAL OF PRACTICE TO DEVELOP THE SKILL TO GUIDE A BALL THROUGH A COURSE. AFTER YOU COMPLETE THE COURSE THE FIRST TIME THE NEXT TIME GETS TOUGHER. THERE ARE SEVEN LEVELS PER GAME SET AND SEVEN GAMES PER SET. STARTING AT THE LEVEL ONE AND INCREASING EACH GAME. SO FAR NOBODY HAS MADE IT THROUGH ALL SEVEN LEVELS. BUT IF YOU DO, YOU CAN TRY THE INTERMEDIATE LEVELS OF PRO LEVELS. BEST OF LUCK YOU'LL NEED IT.

SIDE 2 SPACE CHASE - USES FEW GRAPHICS, BUT GOOD SOUND EFFECTS AS YOU TRY TO GUIDE YOUR SHIP THROUGH 200 LIGHT YEARS TO YOUR DESTINATION. YOU MAY BE ATTACKED BY ENEMY SHIPS, RUN OUT OF FUEL, COLLIDE WITH METEORS, ETC. YOUR AT THE CONTROLS. WARP 1, WARP 2, WAIT FOR HELP, FIRE PHAZER OR EVASIVE ACTIONS, ITS A LONG WAY TO GO BUT A GOOD CAPTAIN CAN MAKE IT WITH A LITTLE HELP FROM FRIENDLY ALIEN.

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SIDE 1 - MAZE RACE

Tape 3.



OBSTACLE COURSE - ALSO FROM SIDE 1

Complete modification kit for your Arcade - \$8.00; Assembled and tested Kludge, \$10. (extra parts needed included with both) Add \$25 for new Data Chip - add \$1 for postage and handling. Barry Ellerson 5017 River Rd., Schiller Park, IL 60176

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## ARCADIAN

Robert Fabris, on schedule  
3626 Morrie Dr.  
San Jose, CA 95127

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EXTENDED BASIC LANGUAGE has been mentioned in these pages for quite a while now, and we are finally able to state that it is available! Jay Fenton, developer of the Bally Basic and the new AstroVision Basic, called me about two years ago, asking if there was any interest in a new language he was then working on. I told him it would have to be able to address more memory space than the 1800 bytes of Bally Basic, and he went back to the drawing board. Subsequently, as he developed the language, and Perkins Engineering developed the Blue Ram memory addition, and Alternative Engineering developed the Viper System memory addition, we were instrumental in having these gentlemen talk to each other to ensure that compatibility would not be precluded. The first tapes of the new language have been received by Alternative Engineering, and they will be supplied free with the smallest expansion they provide, the System 1. See their ad on p. 89. The language will also be provided in a ROM form for direct plug-in into the Arcade, by Perkins Engineering. The engineering work to accommodate this form of presentation is now underway. I have received a sample of the SYSTEM 1, and the Extended Basic language. The language is a great step towards ZGrass in that it has the graphics features of POINT, CIRCLE, SNAP, SHOW, and WINDOW, two sizes of lettering, plus the capability to have four colors anywhere on the screen.

BASIC MANIPULATION One of the things that we plan to do is create small modifications to the Extended Basic language, to provide optional or personalized features. These options could take the form of short programs to be loaded after the Basic was loaded, and it would modify the language itself. We currently modify programs to do things we want, this opens up the language to changes. Conceivably, one could develop a "floating point arithmetic" package modification, or scientific math applications, or new graphic characters for a game or other application.

DELAYS are a familiar story to all-time subscribers. The new AstroVision Basic cartridge was pulled from production in order to make some corrections. George Moses and Tom Wood each found a "glitch" that could cause the program to reset under special circumstances. Even though those circumstances would rarely occur, the AstroVision people decided to make the corrections needed, take the delay in production, but end up with a better product. As it is, about a month was lost. Those of you who have ordered the "AstroVision Basic Listing" will find an error note on page 23 of the listing, covering this.

WHAT TO PRINT or sometimes what not to print, is perplexing. We cannot restate all the basics in each issue, even in each volume. Yet new and unsophisticated readers join us each month, and wonder what we are talking about. My original intent is setting up the Volume structure was to gradually carry us all from the rudiments on towards the sublime. In other words, to get the full story, one has to have all the material from Day One since we can't reinvent the wheel too frequently. The basic tutorial material is available in Volumes 1 and 2, as well as numerous good programs, and each Volume is available at \$10.

GRAPHICS and how to produce them is always of interest, and we have an article by Rich Tietjens in this issue, explaining character generation. Coincidentally, the June issue of Creative Computing has a large article discussing how the TV makes graphics, with the use of the Atari computer. The generalities are the same for all computers, so that this would be an excellent adjunct to Rich's article.

# ARCADIAN

## PRE-TUTORIAL

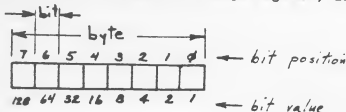
The "pixel" is the smallest object that can be shown on the screen. Its actual size is determined by two things, the physical size of the TV screen itself, and the "resolution" that the computer is capable of. The Arcade will divide every screen into 16320 pixels, disposed at 102 high by 160 wide. Obviously, the pixel is therefore bigger on a bigger screen. These 16320 pixels form the "low resolution mode", and by adding more memory (plus a few other items), the resolution can be increased to twice as many (medium resolution) or twice again to 49280 pixels (high resolution). The Perkins mod described on page 63 can provide any of these resolutions. Well, with four times as many pixels on the same screen, each one has to be one-fourth the size of the original, so detail of objects, characters, etc., is greatly enhanced.

Each pixel is turned "on" or "off" by the TV's electron gun each time it makes a sweep of the screen, so you have to have enough memory on board to remember the status of each pixel. The screen is therefore "refreshed" at every sweep.

The computer stores such common things as characters, letters, etc., in little subroutines and "calls" each one as requested by the program, without having to generate the character every time. The program in Rich's tutorial below indicates a simplified way for you to generate your own character (for a game, etc.,) and control its location by setting up a subroutine that your big program would call as needed. To do this, he sets up a 16 pixel by 10 pixel workspace, and determines which of the pixels in that space has to be "on" to generate the character. This is done outside the program, but the answers are entered into the program for permanence.

### BITS, BYTES, and PIXELS

There are eight "bits" in a "byte". The computer uses bytes in most of its computations, and each one has a number assigned to it, from 0 to 256. This value is calculated by a unique system, as shown:



Each bit can be either a "1" or a "0". For each "1" that is shown, one adds together all the corresponding "bit values". This sum is the "byte value". Every number from 0 to 256 can be developed this way, and there is only one combination to do it. As an example, for a byte value of 84, bits number 6, 4, and 2 must be set equal to "1", for their bit values are 64, 16, and 4 respectively, their sum is 84. Mathematicians will see that the bit values represent the powers of two raised to the bit position.

Now to pixels. Each bit is equivalent to a pixel insofar as the screen picture is concerned. At every "1", the screen will be "on", so we can easily generate a picture by selecting the bits that we want to be "on", determining the byte value, and telling the computer that information - as Rich does in the following:

## TUTORIAL Creating Special Graphics, by Rich Tietjens

Most of us who program in Bally BASIC have often wished for a faster means of creating complex characters on the screen. The most obvious method uses a machine-language subroutine, but many hackers have no desire to "get involved" in the complexities of this mysterious and arcane art. However, if you are willing to do some doodling on paper and a little basic arithmetic, you can create your own special characters without headaches.

First, you must write (or modify) your program to employ the subroutine. This requires at least two variables to position the character; I chose H (for Horizontal) and V (for Vertical).

Now, wherever you want to draw your character, you must set the H and V values; the position 0,0 is in the upper left corner of your screen. Position H,V will define the upper left corner of a character block 16 pixels wide by 10 pixels high. H may range from 0 to 159; V from 0 to 99 (which is off the bottom of the screen). Then POKE 20203, Vx256+H (( that is, program the statement to read -  $\% (20203) = V \times 256 + H$  )) Now, CALL 20200 Voila! There is your character! But wait, we can't RUN your program without the subroutine in place; so make your changes; then go ahead with the rest of this story.

The following routine will draw, move, and limit to the screen area a special character.



When your main BASIC program is modified to your satisfaction, save it to tape; verify a good recording and set it aside.

Now let's define your characters; each is drawn on a 16x10 matrix, thusly:

	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
0																
1					X	X	X									
2				X	X	X	X	X								
3			X		X		X		X							
4			X		X	X	X	X								
5					X	X	X									
6				X	X	X	X	X								
7			X		X	X	X		X							
8			X										X			
9	X	X	X						X	X	X					
10	1120	64	32	16	8	4	2	1	0	64	32	16	8	4	2	1

Note that this positions the figure to the left of the available 16 pixel block. As a drill, see if you can determine the entries that will place the figure at the right side within the block.

RICH TIETJENS  
501 S. ARCHER #5  
SAN ANGELO, TEXAS 76903

```

10 . POSITION AND DRAW
20  $\% (20203) = 256 \times V + H$ ; CALL 20200
30 . GET NEW POSITION
40  $X = H + JX(1)$ ;  $Y = V - JY(1)$ 
50 . WRAPAROUND
60 IF  $X > 159$   $X = 0$ 
70 IF  $X < 0$   $X = 159$ 
80 IF  $Y > 99$   $Y = 0$ 
90 IF  $Y < 0$   $Y = 99$ 
100 . ERASE
110 CALL 20200
120 . CHANGE POSITION AND GO DO IT AGAIN
130  $V = Y$ ;  $H = X$ ; GOTO 20
    
```



In this example, representing an Apollo Lunar Module, the X's show the pixels which will be turned on when the subroutine is called. Since no pixels are turned on in row 0, both bytes equal zero. In row 1, bits 3, 2, and 1 of the left byte are turned on, equalling 8 plus 4 plus 2, or 14; the right byte is still zero.

When you have all the values figured out, load PROGRAM A; RUN it and enter the values computed in the byte value table. If you have two characters, enter any number except zero when asked "two figures?"; enter 0 if you only have one graphic character.

Now, the program will ask "READY?". Press any key (except HALT) to have your character displayed (both will display if you have two.)

If it (they) is/are ok, put the main program tape back in the recorder, with the tape positioned just past the trailing end of the BASIC listing. Start the recorder and press "GO". PROGRAM A will assemble your subroutine and put it on tape. When it is done, you can RESET the memory, load the tape just created, and there is your pet graphic character! If you wish to switch to the second graphic character, just POKE 20213,129 (that is,  $\%(20213)=129$ ). POKE 20213, 128 to switch back.

If instructions are included on the tape, using the REM (.) statement, the machine language subroutine should be recorded after the instructions; otherwise the remarks will override the subroutine. And that's all there is to creating and using your own graphic characters!

(Note for Blue Ram owners: you can do the same thing, but have a lot more room to play around in. Some addresses within PROGRAM A must be changed, along with the CALL address.)

Special thanks to Tom Wood for the effort expended on the On-Board ROM subroutines.

```

PROGRAM A
_001 . GRAPHIC CHARACTER MAKER
1002 . BY RICH TIETJENS
1010 GOTO 1030
1020 %(Y) = U; Y = Y + W; RETURN
1030 CLEAR ; NT = 1; X = 0; Y = 20200; R = Y; W = 2; Z = 1020
1040 FOR U = X TO X + 19 STEP 2
1050 CY = 32; PRINT #2, "ROW", U c 2, ":
1060 INPUT "LEFT BYTE?" @(U)
1070 INPUT "RIGHT BYTE?" @(U + 1)
1080 NEXT U
1090 IF U < 21 INPUT "2 FIGURES?" T; IF T K = 20; GOTO 1040
1100 U = -43; GOSUB Z; U = 6965; GOSUB Z
1110 U = 10240; GOSUB Z; U = 20210; GOSUB Z
1120 U = -13871; GOSUB Z; U = -1936; GOSUB Z
1130 U = -32690; GOSUB Z; U = 12288; GOSUB Z
1140 U = 2432; GOSUB Z; U = 527; GOSUB Z
1150 U = -247; GOSUB Z; U = 78; GOSUB Z
1160 W = 1; Y = Y - W; FOR S = 0 TO U
1170 U = @(S); GOSUB Z; NEXT S
1180 PRINT "READY"; K = KP; CLEAR
1190 %(20203) = 0; CALL R
1200 IF X > 21 %(20203) = 75; %(20213) = 129; CALL R
1210 CY = 0; PRINT "OK?"; IF KP # 13 GOTO 1210
1220 :PRINT ; NT = 2; PRINT ; PRINT "CLEAR"; CY = -32
1230 FOR X = R TO Y STEP 2
1240 PRINT #5, "%(", X, ")=", #6, %(X)
1250 NEXT X; PRINT ":RETURN; RUN
1260 :RETURN; .END

```

don't  
forget,

b means x

c means +

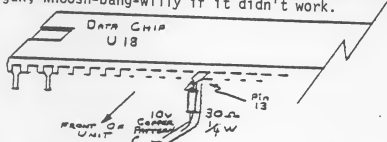
One of the modifications that have been incorporated into the AstroVision Arcade motherboard is the reduction in the power supply voltage. Dan Koppen is doing roughly the same thing to his Bally board...

## Krazy Koppen's Heat Sink

Does your machine poop out after an hour of intense game playing? Do football players get mysteriously tackled by strange dots on the screen? Or does your game just stop as you are shooting your last space invader out of the sky? Well Krazy Koppen just might have the cure for you!!

The cause of all your woes is the data chip (U18). This little babe gets so hot you can fry eggs on it and what's worse, it sits right under the keyboard which makes ventilation nearly impossible. After trying everything short of installing an attic fan, a friend of mine (who shall remain nameless (after all why should I share the credit)) claimed this chip could run on much less than the 10 volts supplied to it.

With trembling fingers I wired a 30 ohm  $\frac{1}{4}$  watt resistor on pin 13, and son-of-a-gun, whoosh-bang-willy if it didn't work.



The above drawing shows exactly how I did it, with one word of caution. Don't over heat pin 13 when soldering on the resistor. You may damage the data chip and have to replace it.

I have had great luck with this fix and now can leave my machine on indefinitely. Hope you have the same results!

Dan Koppen  
(804)-484-1907  
Suffolk, Va.

# ARCADIAN



```

2 .
3 .
4 :RETURN
5 .NIM
6 .R HILFERDING
10 CLEAR :GOSUB 9000
20 NT=0;M=15;K=0;J=0;F=0;CLEAR
30 &(9)=300;FC=0;BC=117;CY=0;CX=-49;INPUT "1 OR 2 PLAYERS?"X
40 IF (X<1)+(X>2)GOTO 30
50 IF X=2GOTO 150
60 CLEAR :CY=0;INPUT "DEGREE OF DIFFICULTY:1-3?"Y
70 IF Y<1PRINT "THAT'S CHEATING!";GOSUB 7000;GOTO 60
80 IF Y>3PRINT "ITS HARD ENOUGH AT 3!";GOSUB 7000;GOTO 60
90 IF Y=1R=1
100 IF Y=2R=RND (2)
110 IF Y=3R=2
120 CLEAR :CY=0
150 CLEAR :&(9)=300;BC=7;FC=96;PRINT " WHO WANTS TO GO FIRST?"
160 PRINT "1-PLAYER 1
170 IF X=2INPUT "2-PLAYER 2"Z;GOTO 190
180 INPUT "3-COMPUTER"Z
190 IF (Z<1)+(Z>3)PRINT "IS THIS TO TOUGH?";GOSUB 7000;GOTO 150
200 IF Z=2IF X=1GOTO 150
210 IF Z=3IF X=2GOTO 150
215 H=Z;IF Z=3H=1
220 CLEAR :FC=0;BC=134;GOSUB 5000
230 IF Z=3GOTO 4000
1000 CY=0;PRINT " PLAYER #",#1,H
1010 P=KN(H)C127+2
1020 CY=-10;PRINT "HOW MANY BOXES?",P
1030 IF TR(H)=0GOTO 1010
1033 IF P>MGOTO 1020
1040 M=M-P
1050 IF X=1IF M=0GOTO 8000
1060 IF M<=0GOTO 8500
1070 GOSUB 6000;IF X=2IF H=1H=2;GOSUB 5500;GOTO 1000
1080 IF H=2H=1;GOSUB 5500;GOTO 1000
1090 IF X=1GOSUB 5500;GOTO 4600
4000 CY=0;CX=-50;PRINT "MY TURN
4010 P=1;M=M-P;R=R-1
4020 GOSUB 6000;GOSUB 5500
4030 GOTO 1000
4500 IF P<=RGOTO 4700
4610 R=R+4
4700 IF M=1GOTO 8300
4701 R=R-P
4710 IF RGOTO 4800
4720 R=4;GOTO 4000
4800 P=R;R=4;M=M-P;CY=0;CX=-50;PRINT "MY TURN
4810 GOSUB 6000;GOSUB 5500;GOTO 1000
5000 FOR T=-75TO 65STEP 10;BOX T,35,5,5,3;NEXT T;T=70;RETURN
5500 BOX 0,0,160,34,2;RETURN
6000 FOR A=1TO P
6005 BOX T-5,35,5,5,3
6010 FOR B=35TO -44STEP -8;BOX T,B,5,5,3;BOX T,B,5,5,3;NEXT B
6020 T=T-10;IF T=-75GOTO 8300
6030 NEXT A;CY=22;CX=35;PRINT #1,M," LEFT";RETURN
7000 FOR Q=1TO 500;NEXT Q;RETURN

```

# ARCADIAN

```

8000 CLEAR ;NT=3;CY=0;PRINT " I BEAT YOU!";GOSUB 7000
8010 F=F+1;GOTO 8600
8300 CLEAR ;NT=3;CY=0;PRINT " YOU BEAT ME!";GOSUB 7000
8310 K=K+1;GOTO 8600
8500 CLEAR ;NT=3;CY=0;PRINT " PLAYER #",#1,H," LOSES!";GOSUB 7000
8510 IF H=1J=J+1
8520 IF H=2K=K+1
8600 CLEAR ;FC=134;BC=96;PRINT ;PRINT "      SCORE:"
8610 M=15;PRINT ;PRINT "PLAYER #1",
8620 IF X=1PRINT "      COMPUTER
8630 IF X=2PRINT "      PLAYER # 2
8635 PRINT
8640 PRINT K,;IF X=1CX=10;PRINT F;GOTO 8660
8650 IF X=2CX=10;PRINT J
8660 PRINT ;PRINT "SQUEEZE TRIGGER TO REPLAY
8665 CX=0;PRINT "OR
8670 PRINT "PRESS '0' FOR A NEW GAME
8680 IF &(22)=16GOTO 20
8690 IF TR(1)=0GOTO 8680
8695 IF TR(1) IF X=1NT=0;GOTO 60
8700 CLEAR ;NT=0;GOTO 150
9000 FC=134;BC=0;&(10)=140;&(1)=32;&(2)=78;&(3)=73;&(4)=77;&(5)=33
9010 CY=-30;FOR A=1TO 5;TV=@(A);NEXT A
9020 NT=0;FOR C=-80TO 40;FOR D=-33TO -27
9030 IF PX(C,D)BOX (C+81)b4-79,(D+30)b4,4,4,1
9040 NEXT D;NEXT C
9050 BOX -59,-30,42,9,2;&(10)=174;RETURN
>

```

Robert Hilferding  
P. O. Box 1647  
Brandon, FL 33511

NIM is a one or two player game where the object is to force your opponent into taking the last piece. Starting with fifteen boxes, the players alternate in removing one, two, or three boxes. (KN determines the number, TR removes the boxes.) In the one player mode, the computer determines how many boxes it will remove.

The program permits options in who starts, and the degree of difficulty option in the one-player mode. Beginning options are entered through the keypad while play options are executed through the hand controllers.

**Colon Organ/Light Show:**  
Interface Daily to your Stereo  
TV displays Colon & Light in  
step with the music.  
(Complete interface unit with Cassette Demo. &  
Tutorial...\$29.95 (Add your own graphics/Art.)

**20 Games** are now available All Use Full  
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Sound & Colon...any Two on Cassette...\$10.00

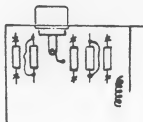
**Write For Free Picture Catalog**  
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**L & M**

BALCHECK is the name of a program that is used to check out the operation of the motherboard at various times during the manufacture of the Bally Arcade. In the original advertising literature, a Videocade with this self-checking ability was to have been made available, but it was never done as far as I have been able to determine. But by George, one looks to be upon the very near horizon. The program (available at \$6.50) has been successfully entered into a PROM, and the plan is to make up a BALCHECK device for sale at a reasonable cost. The unit will connect to the 50-pin connector at the rear, and it is also very possible to package it into a cartridge-sized box so that it will slip into the game slot. This device will then analyze your machine, looking at a number of various items, such as keypad operation, chip functions, color display (it puts up a beautiful rainbow effect with every one of the 256 colors on the screen), and has the capability to accept machine code. If it finds some discrepancy, it uses a pair of alpha-numeric LEDs to indicate, through a code, where the problem is located. I expect Dick Belton, 4906 Willshire Ave., Baltimore, MD 21206 to have an ad in the next issue.

UV-1 COMPUTER is the commercial version of what we will essentially have when the Add-Under is coupled to the Arcade, except for high-resolution graphics. These units are in use by professionals in the graphic arts, and the current issue of Creative Computing (June) contains an article written by Frank Dietrich and Zsuzsa Molnar describing and illustrating in color some of the graphics that they have obtained with ZGrass using the UV-1 computer. In scanning the article, I believe that those effects could be generated with the Extended Basic without too much difficulty.

A grubby piece of paper was shoved under the door, and on it was a note and a sketch - the note said, in greatest Through the Looking Glass tradition, "TRY ME". The sketch is reproduced here, showing the five resistors that exist just underneath the TV output connector inside the RF modulator. The two outer resistors and the center one are suggested to be cut out entirely, while the remaining two are suggested to be shorted with bits of wire to take them out of the circuit. Supposedly, the output is enhanced. It has helped my set.



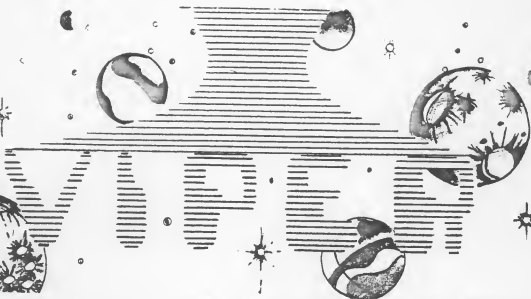
DEFUSE Modifications. Dieter Heinerman sent in the following as a result of some comments and suggestions from Bob Dahl:

```

270 A=RND(100)-1; B=RND(100)-1
280 C=RND(100)-1; IF A>0 GOTO 310
320 PRINT " SIGNAL ",10000-ABS((A+B+C*100)-(D+E+F*100))

```





The VIPER SYSTEM 1 is the first of a series of custom manufactured, quality products made for the Bally Home Computer/Professional Arcade. With this system, you can begin the evolution of your Bally from the Professional Arcade to a powerful graphic computer. The VIPER SYSTEM 1 is a lot more than just a 16K memory expansion. Features and capabilities are listed as follows: one dual position front panel select switch for starting the memory at either 8 or 24K. This will make it convenient for the user to copy any game cartridges and run them in extended RAM where they can be modified or copied to tape. Next, one dual position front panel switch for Auto-Write-Protect or Programmable Write-Protect. The Automatic Write-Protect mode allows the user to load Jay Fenton's excellent new 8K Extended Basic from tape, and then use the Basic to write programs in the remaining 8K. The Programmable-Write-Protect allows you to Write-Protect or Write-Enable the entire 16K RAM board with simple Basic statements. Next, the RAM board located inside the cabinet has two eight position DIP switch packs. Switch pack one enables 4, 8, or 16K bank selectable addressing, and switch pack two controls special bus functions to the Bally and selects either external or internal clocking. SYSTEM 1 also includes a fuse-protected +/- 5 volt and +/- 12 volt power supply. These voltages provide power to the RAM and keyboard interface circuitry. Also included is a heavy duty grounded AC line cord, and filtered AC outlet on the back that is controlled by the front panel switch. The SYSTEM 1 Interface Board provides the bus conversion from the Bally to the VIPER bus, plus a serial keyboard interface which will allow the use of a VIPER or other serialized ASCII keyboard with the system. It also includes one bus cable connecting the VIPER to the Bally. The RAM board and keyboard can be unplugged from the SYSTEM 1 and later plugged directly into the SYSTEM 5 without any changes because the equipment is completely (software and hardware) compatible. For those of you who are home-brewers, when the SYSTEM 1 is upgraded to a SYSTEM 5, the SYSTEM 1 cabinet, power supply, and bus interface card can be used to help prototype your own computer circuits. The entire system is housed in an attractive heavy duty black aluminum cabinet with simulated wood grain side panels and custom silk-screening. The dimensions are 10"x10"x4-1/4".

Due to the response received when originally advertised in past issues of the ARCADIAN, there have been several changes and improvements made to the System RAM card and Interface Card. Therefore, please refer to this advertisement and following advertisements for accurate product information, pricing, and availability. SYSTEM 1 is available now for \$225. A free Extended Basic, on tape and with documentation comes with each SYSTEM 1.

SUPER SOFTWARE announces their "Super Software Spectacular Summer Sale". Now all programs and listings are \$10.00 off!! Send for your free catalog and free Bonus Coupon. Super Software P.O.Box 702 Plainfield, NJ 07061

Now Available... \$5.00... SUMMER 1981 BALLY Professional ARCADE Software and Hardware SOURCEBOOK  
Over 300 listings covering all known software and hardware sources. Complete index of programs that have been printed in the ARCADIAN and CURSOR Newsletters. Dick Houser 635 Los Alamos Ave Livermore CA 94550

FOR SALE: Bally arcade with SPACE INVADERS, BALLY PIN, BASEBALL, FOOTBALL, BLACK JACK, STAR BATTLE, MATH, LETTER MATCH, PANZER ATTACK, SEAWOLF, CLOWNS, 280 ZZAP, BASIC cartridges and cassette interface. \$400 or best offer. Jack Lampcov, 27746 Pierce, Southfield, MI 48076 313-599-6818

FOR SALE Bally with virtually everything. 14 Bally Videocades, 6 Wavemaker tapes, 1 year of Cursor tapes, most literature - over \$800 worth for \$500: R.L.Thersen 69 St. Thomas Ct Pleasant Hill CA 94523

COMMUNITY COMPUTERIST's DIRECTORY is similar to a telephone book for locating people or companies having similar interests. The white pages list people with a paragraph of what they are working on, working with, or want to see available. The yellow pages are advertising areas for people, businesses and organizations. July issue will be \$3.50, from P. O. Box 40 Forestville, CA 95436

HAND CONTROLLER REPAIRS With factory prices now at \$45/pair, it pays to have problems fixed - contact Dave Stocker, 333 Coronado Dr., Mt. Vernon, IN 47620

- 90 -

ARCADIAN  
Robert Fabris, pixillated  
3626 Morrie Drive  
San Jose, CA 95127  
The Source, TCD 959

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--

## VOCALIZE?

Yes, with the Z-GRASS-32 Add Under. Latest word, just received two days before we went to press-via The SOURCE, is that the Add-Under will have a "talking" voice interface! More details on this as they come in, but for the present, the specifications for the Add-Under have been decided upon by all concerned parties, and the unit is GO for a late '81 delivery. It will not have a built-in disc interface capability, but will be configured to accept this as a plug-in optional feature. RAM count is now 16K, while ROM is 32K. The 16K RAM will be expandable to 64K by simple substitution of chips plus a couple of board wiring changes. The disc interface will expand the RAM to 64K, so that the full up system could have 128K of memory!

- **STATUS of other efforts:** The following cartridges are in manufacture: GALACTIC INVASION, BIORYTHMS, and PIRATES CHASE. In work and almost ready to go are: SPACE FORTRESS, CHECKERS, and MUSIC. This last cartridge will have a 8K program to self-store your musical compositions while you are working on them, plus a built-in tape cassette interface to allow you to directly transcribe to and from tape for long-term storage. The Arcade itself is in production, as is the new AstroVision Basic cartridge, and the manual for the cartridge is now being proof-read. Scheduled availability date of the Basic is late August.
- **PERSONNEL CHANGES** Michael Peck is now the President of AstroVision, replacing Dan Dawson in the third week of June. I spoke with Mr. Peck, and he is very interested in getting the AstroVision steam roller under way. John Perkins is working for AstroVision as a consultant, primarily interested in getting the Add-Under into production, while Brett Bilbray is also working for them, with responsibilities in the production Arcade area. George Moses is doing a lot of work for AstroVision in the production of the new Manual to accompany the AstroVision Basic cartridge.
- **BALLYCHECK** is the name given by Dick Belton to his version of the Balcheck program the factory uses to check the motherboards prior to installation in the cases. I received a sample of his effort - it is a compact box, about 2x2x4, with two LEDs for readout, and two cables to connect to the Arcade. One goes to the 50-pin connector, the other to the 5 volt supply at the light-pen connector. Once plugged in, it goes through the routine of checkout, and if a failure is found, the LEDs indicate the area of failure using a code system. It also includes the machine code input routine. Check Dick's ad on p. 100.
- **EDGE TAGS** are again being sold by Roger Saunders. These little stick-on labels are placed on the spine of your game Videocades so that you can read the subjects when the 'cades are stored in the Arcades's rack. Also included are labels for the hand controller plugs. See his ad on p. 97. L & M Software report that they expect their prices to rise soon, so a word to the wise...
- **SPINNING WHEEL** is a combination program that Tom Owczarek uses at Faires as a fund raiser. The first part takes the place of the old 'round and around she goes' wheel of fortune with an RND(30) plus exploding box display while the computer is deciding which of the 30 numbers is the chosen one. Then there are three designs and dummy advertising messages which you would want to change for your own usage. Use GO to restart the game, and always wait for "Place Your Bets" before making any entries.

# ARCADIAN

```

1 .
2 .SPINNING WHEEL
3 .
10 BC=200;FC=215
15 GOSUB 250
17 &(10)=176
20 NT=1
30 CLEAR
40 Z=0
50 CX=-20;CY=25;PRINT "SPINNING"
55 BOX 29,0,20,10,3
60 FOR A=RND (30)
70 CX=-10;CY=0
80 PRINT A
90 B=RND (30)*2;BOX -50,-20,B,B,3
100 Z=Z+1
110 IF Z<50GOTO 60
120 CLEAR
130 CX=-10;CY=35
140 PRINT "STOP"
145 FOR Z=1TO 250;NEXT Z
150 CY=20;PRINT "WINNING NUMBER IS"
152 FOR Z=1TO 250;NEXT Z
155 CX=-15;CY=0
156 PRINT "a ",#1,A," "
160 FOR M=1TO 2000;NEXT M
170 CY=-25;PRINT "PLACE YOUR BETS!"
180 PRINT "MAX. 4 NO. PER PERSON"
190 M=KP
191 IF M=13GOTO 15
192 IF M=49GOTO 350
193 IF M=50GOTO 500
194 IF M=51GOTO 600
195 GOTO 190
250 CLEAR ;Z=0
255 NT=0
260 &(10)=142
270 Z=Z+1
280 IF Z=27GOTO 300
290 CY=-23;PRINT "GOOD LUCK !"
300 FOR Z=1TO 1500;NEXT Z;CLEAR ;RETURN
350 BC=111;&(9)=255;CLEAR ;LINE -80,10,0
351 FC=0;&(10)=176;NT=3
360 FOR A=-80TO 80;LINE A,RND (ABS(A)+1)-10,1
370 NEXT A;LINE 0,-10,0;A=10
380 FOR C=1TO 20STEP 2;A=A+C;B=Ac6;BOX A-3,-B,1+Bc2,Bb10,1
390 BOX A-3,Bb3,Bb5,1+Bc2,1;NEXT C;FOR A=-30TO 30
400 LINE A,-44,1;LINE 0,-10,0;NEXT A;FOR A=-44TO -11STEP 8
410 BOX 0,A,ABS(A)*10,ABS(A)*6,2
411 NT=10;CY=-15;PRINT "P.A.S.S."
412 CY=-25;PRINT "BOOTH"
413 NEXT A;FOR Z=1TO 5000;NEXT Z
419 NT=1
420 &(9)=50;BC=200;FC=215;GOTO 170
500 CLEAR ;&(21)=0;&(10)=176;NT=3;BOX 0,-40,158,6,1
505 BC=240;FC=7
510 FOR A=1TO 50;BOX RND (160)-80,RND (88)-44,1,1,1;NEXT A
520 BOX 0,-20,30,10,1;BOX 0,0,20,30,1

```

Tom Owczarek  
2120 Garrick  
Warren, MI 48091

# ARCADIAN

```

530 LINE 0,0,0;LINE -40,-40,1;LINE 40,-40,1;LINE 0,0,1
540 LINE 0,-20,0;LINE -40,-40,1;LINE 40,-40,1;LINE 0,-20,1;CY=44
550 PRINT " WE'RE OUT OF THIS WORLD
560 FOR Z=1TO 750;NEXT Z;BOX 0,-10,5,10,2
570 FOR Z=1TO 1500;NEXT Z;BOX 45,-20,2,38,1;BOX 58,-9,20,14,1
580 BOX 53,-6,8,6,2;BOX 58,-15,18,1,2;BOX 58,-13,18,1,2;BOX 58,-11,18,1,2
590 BOX 62,-9,9,1,2;BOX 62,-7,9,1,2;BOX 62,-5,9,1,2;NT=1;FOR Z=1TO 5000;NEXT Z;
GOTO 170
600 CLEAR ;NT=0
605 BC=122;FC=7
610 FOR A=35TO 37;CLEAR
620 FOR B=1TO 285;TV=A;NEXT B
625 FOR C=80TO 75STEP 4;BOX C,0,1,88,3;NEXT C
628 FOR C=43TO -43STEP -2;BOX -2,C,156,1,3;NEXT C
630 FOR X=1TO 1500;NEXT X
632 IF A=35GOTO 650
633 IF A=36GOTO 700
635 NEXT A
640 BC=200;FC=215
645 NT=1;FOR Z=1TO 5000;NEXT Z;CLEAR ;GOTO 170
650 CLEAR
651 NT=7
653 PRINT ;PRINT ;PRINT " PARENT ASSOCIATION";PRINT ;PRINT "
PRINT
655 PRINT " SCHOFIELD SCHOOL"
660 PRINT ;PRINT ;PRINT ;PRINT " WELCOMES YOU TO THE FAIR!
664 NT=0
665 FOR Z=1TO 3500;NEXT Z
670 GOTO 635
700 .
701 NT=4
705 PRINT ;PRINT ;PRINT ;PRINT ;PRINT ;PRINT ;PRINT ;PRINT ;PRINT ;PRINT ;PRINT ;PRINT ;PRINT
;PRINT
715 CY=0;PRINT " HAVE A NICE DAY "
720 GOTO 664

```

OF";

---

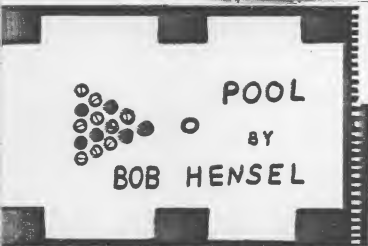
```

2 . DIAMONDS
3 . BY ROBERT ROSENHOUSE
4 . SUPER SOFTWARE
5 .
10 CLEAR ;B=24;C=25;D=30
20 FOR T=1TO DSTEP 2;X=RND (58);Y=RND (27);@ (T)=X;@ (T+1)=Y
30 FOR A=1TO BSTEP 2;BOX X,Y,A,C-A,3;NEXT A
40 FOR A=1TO BSTEP 2;BOX -X,Y,A,C-A,3;NEXT A
50 FOR A=1TO BSTEP 2;BOX -X,-Y,A,C-A,3;NEXT A
60 FOR A=1TO BSTEP 2;BOX X,-Y,A,C-A,3;NEXT A
70 IF RND (7)=1BC=RND (256);FC=BC+4+86RND (32)
80 NEXT T
90 FOR T=1TO DSTEP 2;FOR A=1TO BSTEP 2
100 BOX @ (T),@ (T+1),A,C-A,3;BOX -@ (T),@ (T+1),A,C-A,3;BOX -@ (T),-@ (T+1),A,C-A,3;
BOX @ (T),-@ (T+1),A,C-A,3
110 NEXT A;NEXT T;RUN


```

- HI RES Modification as created by Perkins Engineering - latest word is that the system is available to experimenter-types who can do their own programming. Due to other commitments at the present, Perkins is not available to develop software. So if you want to work on it yourself, and be a real originator, you can buy the kit at \$250, or the built up/tested unit at \$350 (using your board).

- KLUDGE Board written up on page 72 has an error in the transistor callout, it should be 2N4401. Barry Ellerson now has some p.c. boards for sale and a clock kit - see his ad on p. 100.

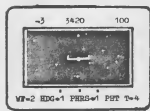


Pool is a computer version of the Billiards game 8-Ball. The computer will rack the balls and break. The direction of the Cue ball is controlled by JX(1) & JY(1). The length of the shot is controlled by the Cue stick at the right of the screen. After selecting the desired angle & length, pull the trigger TR(1) to make the shot. The direction of any other balls hit by the Cue ball is controlled by KN(1). If KN(1) is at its center the other balls will continue in the same direction as the Cue ball. Turning KN(1) all the way clockwise or counter-clockwise will deflect the balls 45 degrees from the path of the Cue ball. **LISTING** →



ROTONICA  
LIMITED

TAPE # 1    5528 Red Fox Run  
\$9.50    Warren, Oh.  
44485



STAR TRIX

You are at the helm of the 400,000 asteroic ton star ship looking through the front view-screen into deep space. It is a weary ship. You have already done battle with a class I cruiser and destroyed a Klingon outpost. Suddenly, a sireo sounds "Red Alert!" Klingon Battle Cruiser" flashes across the sensor readout as the vessel appears on screen, very small at first, but getting larger as it attacks at warp factor 6! Before you react the enemy fires! An alarm sounds! Engineering reports the hit damaged the photon torpedoes & the forward shield is still weakened from the last battle. Another enemy blast fills the screen as it's about to hit. You must act quickly! You are not yet in phaser range. What will you do? **STAR TRIX**, the aggressive game from Zetortica Ltd.



MINI GOLF

A game of computer putt-putt for one to four players. Use the joystick to line up your shot. Hit the ball hard or soft or with the perfect "Golfer's Touch." Bank it off the side boards for those "tricky" shots but don't hit it too hard or you'll end up in the rough. Computer keeps running score for one to four players, including penalty strokes. It also prints player up and hole no.

Both programs make full use of color graphic and sound effects, and perform more functions that can be listed here. Send check or money order to:

Zetortica Ltd.  
5528 Red Fox Run  
Warren, Ohio 44485





BOX 84801  
SCHAMBERG, IL 60193

# Pack Rat

## TAPE 9



INSPIRED BY THE EXCITING MIDWAY ARCADE GAME PAC-MAN, MIKE PEACE HAS CREATED THIS VERSION OF THAT GAME FOR THE HOME COMPUTER. THIS GAME HAS THE EXCITEMENT OF PAC-MAN WITH A FEW CHANGES. YOU MUST EAT UP ALL THE DOTS WHILE AVOIDING THE CAT WHO IS NOT PURSUING OR WAITING TO JUMP ON YOU; FROM TIME TO TIME YOU MUST STOP EATING THE DOTS AND RUN TO GET THE CHEESE (BONUS) FOR A MAXIMUM SCORE. THE HIGH SCORE IS KEPT AS A CONSTANT CHALLENGE TO TRY TO BEAT; GREAT FUN, HAS BEEN SAID TO BE BETTER THAN A LOT OF BALLY'S OWN CARTRIDGES. USES HAND CONTROL. EXCELLENT SOUND EFFECTS. IS IN BOTH NEW AND OLD BASIC. LOADS QUICKLY. \$10.95 POST PAID.

**\$10.95 POST-PAID**

# ARCADIAN



```

10 .POOL
20 .BY BOB HENSEL
30 :RETURN :&(9)=39:&(0)=170:&(1)=170:&(2)=30:&(3)=30:CLEAR :BC=170:FC=7
40 S=1:T=0:NT=0;BOX -3,-2,155,83,1;BOX -3,-2,152,79,2
50 X=75:FOR Y=-42TO 38STEP 2;BOX X,Y,1,1,1;NEXT Y:X=76:FOR Y=-42TO 38STEP 10;B
OX X,Y,1,1,1;NEXT Y
60 X=76:FOR Y=-42TO 38STEP 10;BOX X,Y,1,1,1;BOX -70,32,20,12,1;BOX -70,-35,20,
12,1;BOX 0,-35,23,12,1
70 BOX 64,-35,18,12,1;BOX 64,32,18,12,1;BOX 0,32,23,12,1
80 CY=10;CX=19;PRINT "POOL";CY=-10;CX=-8;PRINT "BY BOB HENSEL";NT=5
90 X=-30;Y=4;B=-8;D=1;FOR A=1TO 5;FOR C=1TO D;Y=Y+6;B=B+9;IF B>10B=1
100 GOSUB 400;NEXT C;D=D+1;Y=ABS(Y)+6;X=X-6;NEXT A
110 BOX -42,-2,1,3,3;BOX -42,-2,3,1,3
120 B=0;Y=-2;FOR X=36TO -24STEP -6;GOSUB 400;GOSUB 400;NEXT X
140 FOR A=1TO 8;FC=90;FOR C=1TO 50;NEXT C;MU=60;FC=7;NEXT A;BOX 0,-2,144,42,2
150 @ (0)=RND (19)+5;@ (16)=RND (4)+5;@ (33)=-71;@ (34)=37;GOSUB 460;GOSUB 400;FOR
B=1TO 15
160 @ (B)=RND (19)+3;@ (B+16)=RND (12)+1;GOSUB 460
170 GOSUB 400;IF PX(X+2,Y+2)=0GOSUB 470
180 NEXT B;GOTO 210
190 @ (0)=13;@ (16)=7;GOSUB 400;GOSUB 460;GOSUB 400
200 @ (33)=@ (33)-6
210 S=S+1;C=-40;Q=2;BOX 79,0,2,88,2
220 BOX 79,C+Q,2,2,1;IF TR(1)=1GOTO 270
230 Q=Q+2;IF Q<80GOTO 220
240 BOX 79,C+Q,2,2,2;IF TR(1)=1GOTO 270
250 Q=Q-2;IF Q<0GOTO 230
260 GOTO 240
270 B=0;Q=Q+2;MU=60;IF JX(1)=0IF JY(1)=0GOTO 300
275 GOTO 290
280 W=KN(1);IF ABS(W)<65GOTO 300
282 W=W+65;IF U=0U=W;GOTO 300
284 IF H=0H=W;GOTO 300
286 H=0;GOTO 300
290 H=JX(1);U=JY(1)
300 GOSUB 460;J=X+Hb6;K=Y+Ub6;IF (J<-75)+(J>70)H=-H;MU=60;GOTO 300
304 IF (K<-40)+(K>35)U=-U;MU=60;GOTO 300
306 IF PX(J,K+2)=0GOTO 330
310 C=B;FOR A=0TO 15;IF (@ (A)=@ (B)+H)b (@ (A+16))=@ (B+16)+U)B=A
320 NEXT A;IF B<C MU=60;GOTO 280
330 BOX X,Y,5,5,2
340 X=J;@ (B)=@ (B)+H;Y=K;@ (B+16)=@ (B+16)+U;GOSUB 400
350 IF PX(X+2,Y+2)=0GOSUB 470;Q=0;IF B=0GOTO 190
360 Q=Q-1;IF Q>0GOTO 300
390 GOTO 210
400 MU=50;IF B=0BOX X,Y,3,3,3
410 IF B>7BOX X,Y,1,3,3
420 IF B=8BOX X,Y,3,1,3
430 BOX X,Y,5,5,3;RETURN
440 @ (33)=@ (33)+6;IF B>8@ (33)=@ (33)-6;@ (34)=@ (34)+6
450 RETURN
460 X=@ (B)b6-75;Y=@ (B+16)b6-44;RETURN
470 GOSUB 400;Y=41;X=@ (33);@ (B)=0;IF B>8X=@ (34)
480 MU=70;MU=71;MU=72;MU=73;MU=74;MU=50;MU=48;GOSUB 400;GOSUB 440;IF B<0T=T+1
510 IF T=15GOTO 500
520 IF B=8GOTO 540
530 @ (B)=30;RETURN
540 BOX 0,0,146,50,2;CX=-23;CY=8;PRINT "GAME OVER
550 PRINT :CX=-41;IF T#15PRINT "8 BALL LOSER
560 IF TR(1)=1GOTO 30
570 GOTO 560

```



```

1 .
2 .
3 .
4 .OLD BENT NOSE
5 .BY BOB WISEMAN
10 Q=1100;GOTO Q
100 A=12;GOSUB H;GOSUB I
110 GOSUB K;IF UGOTO 190
115 B=A+W-5bU;IF A=BGOTO N
120 IF (B<0)+(B>24)GOTO N
130 GOSUB I;A=B;GOSUB H;GOSUB I;FOR X=1TO 9;MU=25;NEXT X
170 GOSUB K;IF UbU+WbWGOTO 170
180 GOTO N
190 IF @(A)<0GOTO N
195 GOSUB I;RETURN
200 GOSUB 600;GOSUB 100;L=A;IF @(L)=0GOSUB 1000;GOTO D
220 GOSUB 500;GOSUB 100;IF A=LGOSUB 220
230 IF @(A)=0GOSUB 1000;A=L;GOSUB H;GOSUB J;GOTO D
235 GOSUB H;GOSUB 500;FOR X=1TO Q;NEXT X
240 IF @(A)*@(L)GOSUB 700;GOTO D
250 GOSUB 800;GOTO D
310 W=Ac5;C=2B-15bW;R=Rmb15-26;RETURN
320 BOX R,C,15,15,3;RETURN
330 U=TR(P);U=JY(P);W=JX(P);RETURN
400 BOX R,C,15,15,1;BOX R,C,13,13,2
410 IF T=1BOX R,C,11,5,1;BOX R,C,5,11,1
420 IF T=2BOX R,C,11,11,1;BOX R,C,7,7,2
430 IF T@A=-T
440 RETURN
500 F=@(A)c2;BOX R,C,11,11,1
505 S=C+3;G=RM;IF GBX R-3,S,1,3,2;BOX R-3,S,3,1,2;BOX R+3,S,1,3,2;BOX R+3,S,3,1,2
510 IF G=0BOX R-3,S,3,3,2;BOX R-3,S,1,1,1;BOX R+3,S,3,3,2;BOX R+3,S,1,1,1
515 F=Fc2;Y=RM;IF YBOX R,C,1,1,2
520 IF Y=0BOX R,C,3,1,2;BOX R,C+2,1,3,2
525 F=Fc3;BOX R,C-3,7,3,2
530 IF RM=0BOX R,C-2,5,3,1
535 IF RM=1BOX R,C-4,5,3,1
540 NT=30;MU=49+9bG;MU=49+9bY;MU=49+4bRM;NT=3;RETURN
600 P=3-P;CX=M;PRINT "PLAYER",#2,P,"'S TURN";BC=232;IF P=2BC=56
605 RETURN
700 T=0;GOSUB J;A=L;GOSUB H;GOSUB J
710 CX=M;PRINT "IS NOT A MATCH ";RETURN
800 T=P;GOSUB J;GOSUB 850;A=L;GOSUB H;GOSUB J;GOSUB 850
805 CX=M;PRINT "MATCH!! MATCH!!",
810 FOR X=0TO 24;IF @(X)>0RETURN
820 NEXT X;CX=M;PRINT "IT'S A DRAW. ",;GOTO 910
850 B=Ac5;C=RM;B=Bb5
860 FOR X=0TO 2
870 IF (@(B)=@(B+1))b(@(B+1))=@(B+2))GOTO 900
880 IF (@(C)=@(C+5))b(@(C+5))=@(C+10))GOTO 900
885 B=B+1;C=C+5;NEXT X;RETURN
900 CX=M;E=1;PRINT "YOU HAVE WON!!!",
910 FOR A=0TO 24;GOSUB H;IF @(A)=0GOSUB 1000
920 IF @(A)>0GOSUB 500
930 NEXT A;STOP
1000 BOX R,C,11,11,1;BOX R,C-3,9,1,2
1005 FOR X=0TO 3;BOX R-3+2bX,C-3,1,3,2;NEXT X

```



# ARCADIAN

```

1010 BOX R+3,C+3,3,3,2;BOX R+3,C+3,1,1,1;BOX R-3,C,3,1,2;BOX R-2,C+1,3,1,2
1020 BOX R-1,C+2,1,1,2;BOX R,C+3,1,3,2;BOX R-3,C+3,3,1,2;BOX R-3,C+3,1,3,2
1025 IF ERETURN
1030 CX=M;PRINT "ACK! BENT NOSE!";
1050 FOR X=1TO 30;MU=87;NEXT X;T=0;GOSUB J;CX=M;PRINT "HE HIDES AGAIN ";
1080 R=RND (24);IF @(R)<1GOTO 1090
1090 @(A)=@(R);@(R)=0;RETURN
1100 T=0;P=2;M=-40;CLEAR ;H=310;I=320;J=400;K=330;N=110
1110 FC=119;E=0;FOR A=0TO 24;GOSUB H;GOSUB J
1120 B=A+13;@(A)=RM+1;NEXT A;@(12)=0
1130 FOR A=0TO 24;B=RND (24);C=0;@(A);@(A)=0;@(B)=C;NEXT A
1140 D=200;GOTO D

```

\*\*\*\*\*  
 \*\*\* OLD BENT NOSE \*\*\*  
 \*\*\*\*\*

THIS IS A TWO PLAYER GAME PLAYED ON A FIVE BY FIVE GRID. THE OBJECT OF THE GAME IS TO GET THREE OF YOUR MARKERS IN A STRAIGHT LINE HORIZONTALLY OR VERTICALLY. PLAYER ONE USES PLUS SIGN MARKERS; PLAYER TWO USES ZEROS. ON THE GRID, TWELVE PAIRS OF FACES ARE HIDDEN. WHEN IT IS YOUR TURN, USE THE JX AND JY ON THE GAME CONTROLLER TO MANUEVER THE REVERSED BOX TO THE SQUARE THAT YOU WANT TO GUESS. PULL THE TRIGGER. NOW GUESS ANOTHER, TRYING TO FIND THE MATCHING FACE. IF THE TWO FACES THAT YOU HAVE EXPOSED MATCH, THEN YOUR MARKER IS PUT ON THOSE SQUARES. FIRST PLAYER TO GET THREE OF HIS/HER MARKERS IN A LINE (NOT DIAGONALLY) WINS. BUT WATCH OUT!! OLD BENT NOSE IS HIDING OUT THERE TOO. IF YOU PICK HIS SQUARE, YOUR TURN ENDS AND OLD BENT NOSE TRADES PLACES WITH ANOTHER HIDDEN FACE. THIS GAME COMBINES GUESSING, MEMORY, AND STRATEGY.

## MUSIC FOR GAMES

```

10 FOR A=256 TO 0STEP -4
20 &(23)=A; &(21)=A; &(19)=200
30 IF A=4A=256;IF TR(1)A=0
40 NEXT A: &(23)=0; &(21)=0

```

BY MIKE PEACE

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ONBOARD CALCULATOR,(\$), has not been utilized fully. The ARCADIAN tutorial on its basic operation was published in Vol 1, p.32. At that time, each digit of each number had to be individually entered, an arduous task. Then, in Vol 2, p.2, Gerry Halquist presented a loan payment program with greatly simplified input, but still having restrictions (such as interest had to be entered in 5 digit format). Now Jess Shadle has made up a number of programs where the input format can be almost anything and the program will accept and utilize it. One program is included this issue, Compound Interest. Some notes:

entering principal-you can use either \$1000 or 1000.00 or 1,000.00; if you do not use \$, then you must press I after the amount. Entering interest, any of the following will work: 5.2% .052 5.2 but no fractions. Term of loan must be in years. If you make an error, HALT the program and start again.

If you find this program of value to you in this application or any other, send Jess a buck to help keep his creative juices flowing. He currently is working on trig functions, quadratic equation solutions, sinking fund solutions, and similar programs - primarily for Blue Ram application.

The capability to do these functions is not included in the AstroVision Basic, being removed for other features. The routine reside in the Bally Basic between locations 2194H and 2226H, plus some subroutine calls. When the VIPER system becomes more in use, one could transcribe the routine into the VIPER, store the routine on tape, and have it available for when the occasion demands.

For those of you unfamiliar with the calculator format, it is \$n@(x),@(y),@(z) where n is one of the four arithmetic operators: + - x ÷ ; @(x) will be the string location of one of the two numbers being worked on while @(y) is the string location of the other. @(z) is the string location of the answer.

# ARCADIAN

```

1 .
2 .
3 .COMPOUND INTEREST
4 .BY JESS SHADLE
10 CLEAR
20 FOR A=0TO 165:@(A)=0:NEXT A
30 FOR XY=20078TO 20120STEP 2;%(XY)=0:NEXT XY
31 F=100;G=200
34 PRINT "COMPOUND INTEREST"
36 S=2
38 IF S=2P=6000;GOTO 75
60 .
70 CLEAR ;PRINT "RUNNING";RETURN
75 @(98)=2;@(99)=1;@(134)=1;PRINT "LOAN AMOUNT";PRINT ;GOSUB 3030
100 CX=-32;Z=1;FOR B=RT0 SSTEP -1;IF @(B)="0" IF ZGOTO 130
109 IF U=0PRINT "$";V=1
110 Z=0
120 TV= @(B)
121 IF (B=11)+(B=29)+(B=47)+(B=65)+(B=83)+(B=101)+(B=119)+(B=136)+(B=155)PRINT
",",
130 NEXT B
140 U=0;RETURN
200 PRINT ". ";FOR B=TT0 USTEP -1;TV= @(B);NEXT B;PRINT ;V=0;RETURN
500 IF E<2N=7
510 IF E=2N=25
520 IF E=3N=61
530 FOR I=1TO B
540 @(N+A)= @(165+J)
550 A=A-1;J=J+1
560 NEXT I
561 @(46)=1
570 IF E=2IF ( @(26) )+( @(27) )+( @(28) )>0$C @(18), @(36), @(18)
580 A=0;B=0;C=0;J=0;PRINT ;RETURN
3030 CX=-30;CY=CY-8
3040 K=KP
3041 IF K=31 GOTO 10
3042 IF K=36TV=K;GOTO 3040
3043 IF K=37TV=K;GOTO 3040
3044 IF S>0IF K=13GOTO 3040
3045 IF K=44TV=K;GOTO 3040
3050 IF K=46C=1;TV=46;GOTO 3040
3060 IF K=73E=1;GOSUB 500;PRINT "INPUT INTEREST RATE, THEN";PRINT "PRESS T";P
RINT ;CX=-20;GOTO 3040
3070 IF K=84E=2;GOSUB 500;PRINT "INPUT YEARS, THEN";PRINT "PRESS P";CX=-20;GOTO 3
040
3080 IF K=80E=3;GOSUB 500;GOSUB 60;GOTO P
3090 IF K=67STOP
3100 TV=K
3110 @(165+B)=K
3120 B=B+1
3130 IF C=1IF E=0U=U+1;IF U=2K=73;GOTO 3060
3140 IF C=0A=A+1
3150 GOTO 3040
6000 $b @(54), @(90), @(90)
6002 FOR Q=36TO 53; @(Q)=0;NEXT Q
6005 $+ @(0), @(36), @(36)
6010 $b @(0), @(18), @(144)
6015 $; @(0), @(144), @(0)

```

Jess Shadle  
7 Cul de Sac  
West Chicago, IL 60185

FOR SALE Computer Ear with documentation and software. \$55. Rory Wohl, 3513 Lynnfield, Shaker Heights, OH 44122

FOR SALE Basic, Interface, all issues of Arcadian Newsletters, Documents, 10 cassettes, programs, manuals, and more. A must for the serious programmer. First \$100 takes it. Robert Jaeger, 58 Millay Rd. Morganville, NJ 07751 201-536-3274

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---

CONTEST ENTRANTS this month were Bob Hensel, with POOL, and Bob Wiseman with Old Bent Nose. The winner of the \$100 check will be indicated by a big \$ on the program page. The winner will be determined by the judging panel who will let me know at the last moment, after this issue is complete. Anyway, at this time I can congratulate Bob, who will replace Dick Strauss on the panel.

---

-100-

ARCADIAN

Robert Fabris, vocalizer  
3626 Morrie Dr.  
San Jose, CA 95127



**MEMORY EXPANSION COMPARISONS** I've been asked about the memory expansion schemes - the Blue Ram, the VIPER, and the future Add-Under. I really can't answer "Which is best?" because it depends on what you want to do, how involved you want to get, how much you can afford to spend, such type factors. A 'problem' with the systems is that they are not directly comparable. It is difficult to set up a grading system because each has virtues beyond such factors as 'dollars per K of memory' or some other attempt at rationalization. You have to look at what other features are involved with each unit, and what is important to you. In a way it is a more comfortable situation than we had over a year ago when there was very little to look forward to.

**MORE FOR YOUR MONEY** With this issue, we surpass last year's total output (106 pages), and by the time we finish the year out, the pages per dollar will also better last year's - even accounting for the postage increase. So at least from a volume standpoint, you are beating inflation. Who else can state that fact?

**VIPER SYSTEM** You'll find their ad on page 109, this time with two photos of their first product output. The last of the parts has arrived, and they are ready to ship units, with the new Extended Basic language included.

**ASTRO VISION BASIC** is on schedule, the last obstacle was the necessity to drill two holes in the case for the tape jack and the LED level indicator. The instruction Manual is in print, and the package should soon be out. The Manual includes a program which will allow the new Basic to load existing programs (at the 300 baud rate), so that they can be used and stored with the new 2000 baud rate. We have a copy here, and are translating selected ARCADIAN programs into the new format. These programs will be made available on tape to purchasers of the new Basic and the total Arcade Plus system, and the authors included will receive royalties based on program size.

**SPEECH SYNTHESIS** for the new AddUnder will use the Votrax SC-01 Chip. This chip implements the 'formant synthesis' technique to model the human voice's resonances, making up each of the sounds one utters. These sounds are selectively added together by the computer to make up a word, using a 'phoneme generator'. Each of the 64 available phonemes has an 8-bit code, with two of those bits used for pitch control.

**CONTEST THOUGHTS** We have four entries for the regular, ongoing prize of \$100. this issue: Bally Black Box, Daredevil, New Sub Search, and Pits. The winner of this contest will replace Dave Ibach on the judging panel. With regard to the future, we will be entering an interim period where there will be first a few, then more and more of the AstroVision Basics in the field, and those owners will (hopefully) become ARCADIAN subscribers. Any AstroVision Basic programs submitted on the near future will not be considered because the subscriber population will be very small. I'll keep a tally, and sometime next year we'll have a date when those programs will be accepted.

# ARCADIAN



```

1 .NEW SUB SEARCH
2 .BY RON PICARDI
5 GOTO 100
10 LINE X+12,Y+Rb2,0;LINE X-10,Y-Rb2,3;LINE X+11,Y-1+Rb2,0;LINE X-10,Y-1-Rb2,3

11 LINE X+10,Y-2+Rb2,0;LINE X-8,Y-2-Rb2,3;LINE X,Y,0;LINE X-Rb2,Y+6,3
12 LINE X+1,Y,0;LINE X+1-R,Y+3,3;RETURN
20 BOX -30,-30,10,3,3;BOX -20,-20,2,3,3;RETURN
30 FOR A=1TO 2;FOR B=-20TO 20STEP 3;Q=FC;FC=BC;MU="!";FC=Q;LINE X,Y,0;LINE X+B
,Y+20,3;NEXT B;NEXT A;RETURN
40 FOR A=1TO 10;&(22)=255;FOR B=60TO 10STEP -1;&(18)=B;NEXT B;&(22)=0;FOR B=1T
O 30;NEXT B;NEXT A;RETURN
50 X=0;Y=0;CLEAR ;BOX 0,-20,150,36,1;GOSUB 10;PRINT "SONAR CONTACT";GOSUB 20
55 FOR A=1TO 10;&(18)=30;FOR B=255TO 0STEP -10;&(22)=B;NEXT B;FOR B=1TO 30;NEX
T B;NEXT A;RETURN
100 CLEAR ;R=0;U=RND (10)b15-90;V=RND (10)b5-25;S=RND (10)b15-90;T=RND (10)b5-2
5
105 C=1;FOR A=-75TO 60STEP 15;FOR B=-20TO 25STEP 5;BOX A,B,1,1,1;NEXT B;NEXT A
106 CY=-30;PRINT "USE JOYSTICK TO SEARCH
110 X=U;Y=V;GOSUB 10;GOSUB 10010;CY=40;PRINT "MOVE #",#2,C;C=C+1
120 U=U+JX(1)b15;V=V+JY(1)b5;IF U-X+V-Y=0GOTO 120
130 IF U>60U=60
131 IF U<-75U=-75
132 IF V>25V=25
133 IF V<-20V=-20
140 IF U=SIF V=TGOTO 200
145 IF RND (100)=1GOTO 500
150 GOSUB 10;GOTO 110
200 GOSUB 50;U=RND (5);V=RND (5);Z=RND (3);S=3;W=3;H=0
210 CLEAR ;PRINT "SUB WAS,";IF S>VPRINT "NORTH",
211 IF S<VPRINT "SOUTH",
212 IF S#VIF W#VPRINT " AND ",
213 IF W>VPRINT "WEST
214 IF W<VPRINT "EAST
215 IF H>ZPRINT "TOO LOW
216 IF H<ZPRINT "TOO HIGH
217 IF H=ZPRINT "DEPTH OK
220 CX=0;CY=24;NT=0;PRINT " 1 2 3 4 5";CX=0;PRINT "1 * * * * *";CX=0;PRINT "2
* * * * *"
221 CX=0;PRINT "3 * * * * *";CX=0;PRINT "4 * * * * *";CX=0;PRINT "5 * * * * *
230 BOX -1+Wb12,24-Sb8,7,7,3
240 CY=0;PRINT "DEPTH",#2,H;NT=3
250 PRINT "ENTER DATA";INPUT "N - ",S;INPUT "E - ",W;INPUT "DEPT",H
260 CLEAR ;BOX 0,-20,150,36,1;Y=0;FOR X=0TO 36STEP 3;GOSUB 10;BOX 0,-X,1,1,3;FO
R A=1TO 30;NEXT A;BOX 0,-X,1,1,3;GOSUB 10;NEXT X
270 GOSUB 10;X=0;Y=-36;GOSUB 30;IF V=SIF U=WIF H=ZGOTO 400
280 IF RND (5)=1GOTO 501
290 CLEAR ;GOTO 210
400 PRINT "BOOM";GOSUB 20;X=-30;Y=-30;GOSUB 30;GOSUB 20;G=G+1
410 IF RND (10)=1PRINT "YOU STARTED WW3";GOSUB 40;PRINT "SELF DESTRUCT IS SET";
GOSUB 40;&(8)=3
420 GOTO 1000
500 GOSUB 50
501 PRINT "TORPEDO ATTACK";GOSUB 30;GOSUB 10;Y=-2;GOSUB 10;PRINT "ABANDON SHIP"
;GOSUB 40

```

Ron Picardi  
630 Bacon  
Saginaw, MI 48603

# ARCADIAN

```

510 GOSUB 10;FOR R=0TO 2;GOSUB 10;FOR A=1TO 30;NEXT A;GOSUB 10;NEXT R
520 FOR Y=-2TO -30STEP -2;GOSUB 10;FOR A=1TO 30;NEXT A;GOSUB 10;NEXT Y
530 I=I+1
1000 CLEAR ;PRINT "SUBS SUNK",#2,G,#2;PRINT "SHIPS LOST",#2,I;PRINT "PLAY AGAIN?"
1-YES 2-NO"
1010 IF &(23)=8GOTO 100
1020 IF &(22)=8GOTO 1040
1030 GOTO 1010
1040 PRINT "OK I HOPE THAT YOU ENJOYED YOURSELF";STOP
10000 FOR A=1TO 2000;NEXT A;RETURN
10010 FOR A=1TO 200;NEXT A;RETURN

```

## New Sub Search

This revision of the Sub Search printed in an earlier issue of Arcadian has several new and better features. The search mode on the 10 by 10 sea map is done with the Joystick, you can move your ship in any of eight directions. A move counter is displayed as well as the ship's location. The same will wait for you to use the Joystick to move. You continue searching until you find the sub or it finds you.

If the sub shoots you, your ship sinks by the stern.

When you find the sub, a 5 by 5 sonar map is displayed along with information on about where the sub is to the inverse marker. You then enter target information. The screen is not cluttered with the variable used. Your depth chase is dropped and you hit or miss.

Oh, by the way, it is possible to cause world war 3. the program will self destruct, so be sure it is on tape. If you don't want to reload each time it happens, delete &(8)=3 from line 410. Your score is displayed at the end of each game. Have fun, programmed by Ron Picardi.

By the way, Ron's output is done using the Wiseman Apple Interface.

## BALLY BLACK BOX

by Steve Walters

This is a computerized version of a game produced by Parker Brothers. An article in Creative Computing (Feb., 1980) discussed the game for a PET program.

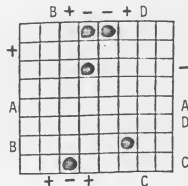
**How the game is played:** The black box is an 8x8 grid. At the beginning of each game, the computer locates 5 balls (i.e., obstacles), one in each of 5 randomly selected squares. The balls are invisible to the player.

The object of the game is to determine the locations of the 5 balls least amount of information possible.

The player obtains information about the location of the balls by sending a probe into the box at one of the 32 edge squares, and observing its behavior: it may emerge at another edge square, be reflected back to the square the probe entered, or be absorbed. Based on these observations and the rules for how probes move, the player can deduce the location of the 5 balls.

The rules for how probes move:

1. PASS-THRU: A probe moves in a straight line unless it comes within one square (including one diagonal square) of a hidden ball.
2. ABSORBED: A probe which runs directly into a ball is absorbed.
3. DEFLECTED: When a probe encounters a ball in its left-front square (i.e., diagonally to the left in the direction of travel) it is deflected 90 degrees to the right. Similarly, when a probe encounters a ball in its right-front square, it is deflected 90 degrees to the left.
4. REFLECTED: A probe which encounters a ball in both its left-front and right-front corners is reflected back 180 degrees (i.e., it reverses direction).
5. DEFLECTED AT ENTRANCE: A probe which would be deflected before it enters the box (because a ball is diagonal to the probe entry location in the outer row) is reflected to its starting location.
6. ABSORPTION DOMINATES: note that when a probe encounters an absorption and a reflection or deflection situation side-by-side, the absorption always dominates.



A=straight pass-thru  
 B,C,D=deflected right  
 or left  
 +(left)=reflected  
 +(top & bottom)=  
 deflected at entrance  
 -(bottom & right)=  
 absorbed  
 -(top)=absorbed which  
 dominates over re-  
 flection in adjacent  
 square

\$

Steve Walters  
556 Langfield  
Northville, MI 48167



Now enter the following:

```
:PRINT; TV=0; TV=6; PRINT "&(9)=81;
&(0)=142; &(1)=142; &(2)=0; &(3)=0;
BC=155; FC=7; H=100; J=68; K=36;
S=10; :RETURN; NT=2; PRINT; PRINT;
GOTO 40"
```

```
150 IF @(B-F)+@(B+F)>0GOSUB 6;TV=43;GOTO 7
160 GOTO 210
200 E=B;B=B+D;G=BcS; IF (RM=0)+(RM=1)+(B<89)+(B<12)GOTO 20
210 N=0;GOSUB 30;IF NGOTO 7
220 IF @(B-F)IF @(B+F)GOTO S
230 IF @(B-F)GOTO 11
240 IF @(B+F)GOTO 13
250 Z=Z-2;IF Z<0Z=0
252 GOTO 200
500 MU=J;IF U=0T=4;GOTO 50
510 O=1-2bPX(X,Y)+O
515 BOX -46,-20,J,17,2;IF O=4GOSUB 19;CY=-16;PRINT "LAST";PRINT "GUESS
520 IF O<5GOTO 79
600 GOSUB 16;GOSUB 19;PRINT #1,"SCORE=",Q;@(H+T)=Q;@(H+T+4)=@(H+T+4)+Q
630 IF TR(T)GOTO 640
632 GOTO 630
640 CLEAR ;CY=32;IF T=PPRINT "END ",
642 PRINT #2,"ROUND",U;FOR N=1TO P;PRINT ;PRINT #1,"#",N," SCORE=",@(H+N);,IF T
=PPRINT #1," AUG=",@(H+N+4)cU,
648 PRINT ;NEXT N
650 IF TR(T)GOTO 50
652 GOTO 650
```

## ANALOG (NON-DIGITAL) CLOCK

After the clock face appears on the screen the computer will take a few seconds to figure out the coordinates for the minute dots and store them in array locations 0 thru 119. Then, in the upper left corner of the screen you will be asked to INPUT "H", hours, "M", minutes and "S", seconds. When you press GO you'll see the three clock hands, including a moving sweep second hand keeping accurate time. If clock speed needs adjusting change the value or R in line 230. A smaller number will speed up the clock, and a larger number will slow it down.

### 1. ANALOG (NON-DIGITAL) CLOCK

#### 2. BY GEORGE MOSES

```
10:RETURN;NT=0;GOTO 80
20 D=(C*10)+(B+12*2);XY=0;LINE
@ (D)+2,@ (D+1)+2,3
30 E=B*2;XY=0;LINE @ (E),@ (E+1),3
40 FOR F=A*2TO 119STEP 2;XY=0;LINE
@ (F),@ (F+1),3;FOR T=1TO R:NEXT
T;XY=0;LINE @ (F),@ (F+1),3;NEXT
F;A=0;XY=0;LINE @ (E),@ (E+1),3
50 B=B+1;IF B=60B=0;C=C+1
60 IF C=12C=0
70 XY=0;LINE @ (D)+2,@ (D+1)+2,3;GOTO 20
80 CLEAR ;FC=140;BC=0;BOX
0,0,160,88,1;BOX 0,0,100,84,3
90 CX=-2;CY=36;PRINT "12
100 CY=32;CX=-27;PRINT "11";CX=25;PRINT
```

```
110 CY=18;CX=-41;PRINT "10";CX=38;PRINT
"2
120 CX=-40;CY=0;PRINT "9";CX=41;PRINT
"3
130 CY=-16;CX=-37;PRINT
"8";CX=38;PRINT "4
140 CY=-32;CX=-24;PRINT
"7";CX=25;PRINT "5
150 CY=-36;CX=1;PRINT "6
160 @ (0)=0; @ (1)=30; @ (2)=4; @ (3)=30; @ (4)
=9; @ (5)=30; @ (6)=13; @ (7)=29; @ (8)=
17; @ (9)=28; @ (10)=21; @ (11)=27
170 @ (12)=24; @ (13)=25; @ (14)=27; @ (15)=
23; @ (16)=29; @ (17)=21; @ (18)=31; @ (19)
=18; @ (20)=32; @ (21)=15
180 @ (22)=33; @ (23)=12; @ (24)=34; @ (25)=
9; @ (26)=35; @ (27)=6; @ (28)=35; @ (29)=
3; @ (30)=35; @ (31)=0
190 B=28;FOR A=32TO60STEP2; @ (A)= @ (B);
@ (A+1)=-( @ (B+1));B=B-2;NEXT A
200 B=2;FORA=62TO90STEP2; @ (A)=-( @ (B));
@ (A+1)=-( @ (B+1));B=B+2;NEXT A
210 B=28;FOR A=92TO
118STEP2; @ (A)=-( @ (B));
@ (A+1)= @ (B+1);B=B-2;NEXT A
220 FORA=0TO118STEP2;BOX
@ (A),@ (A+1),1,1,0;NEXT A
230 R=378
240 CY=40;INPUT "H" C;CY=40;INPUT
"M" B;CY=40;INPUT "S" A;BOX
-65,40,30,8,1;GOTO20
```

# ARCADIAN

```

1 . DAREDEVIL
2 . BY DAVE MARTIN
5 U=7;U=8;L=0;W=35;J=1;T=100
10 CLEAR ;NT=0;BC=0;FC=253;BOX 0,35,160,13,1;BOX 0,35,158,11,2;Y=5;FOR X=-68TO
70STEP 2;A=Xc20;A=ABS(RM);BOX X,Y,1,1
20 BOX X,Y+1,1,3,A=0;BOX X,Y+2,1,5,A=10;NEXT X;CY=15;CX=-52;PRINT "40",;CX=W;P
RINT 280;BOX 0,-5,45,J,1;BOX 0,-5,43,9,2
30 Y=-15;X=60;BOX X,Y,33,13,1;BOX X,Y,31,13,2;BOX X,Y,21,25,1;BOX X,Y,21,23,2;
CX=-30;CY=-15;PRINT "MILES TO GO
35 CY=-35;CX=52;PRINT "TIME";GOSUB 660;BOX 0,22,43,J,3;BOX 0,22,41,J,3;A=RND (
10)+20;Y=A;M=0;T=0;P=1;N=5;GOTO 50
40 P=RND (3);IF P=1P=5
50 IF ABS(L)>17GOTO 430
60 GOSUB 650;GOSUB 450;GOSUB Bb10+60;GOTO 200
70 M=Mb3+RND (10)+20;RETURN
80 M=Mb3c2+RND (6)+7;RETURN
90 M=Mb7c8+RND (5)-6;RETURN
100 M=Mb3c4+RND (9);RETURN
110 M=Mb9c10+RND (Mc5+1);L=L+25b((B=5)b2-1);RETURN
120 M=Mb13c14+RND (Mc5+1);L=L+15b((B=6)b2-1);RETURN
130 GOTO 110
140 GOTO 120
200 IF M<0M=1
210 IF A-Mc80>0GOTO 320
220 T=T+Ab3600cM
230 CY=W;CX=-59;BOX 0,W,160,J,2;PRINT "F I N I S H L I N E";GOSUB 660;CX=-7;CY
=-5;PRINT "0.0
240 CY=-24;PRINT "YOU PLACED #",#3,Tc(Yb2)-5;PRINT "AVG. SPEED = ",#1,Yb360c(Tc
9),"MPH
270 IF JY(1)RUN
280 GOTO 270
320 IF M>280CY=-30;PRINT "LEAD F00T!!";GOTO 430
390 T=T+30;A=A-Mc80
395 IF M<20GOTO 50
400 IF (P=1)+(P=2)+(P=4)+(P=6)GOTO 40
410 P=P+1;GOTO 50
430 GOSUB 650;IF M>280BOX 0,3,160,1,1
440 CY=W;CX=-65;PRINT "SMASH - INTO THE WALL!";GOTO 270
450 CX=-71;CY=W;BOX 0,W,158,11,2;GOSUB 450+Pb10;GOTO 515
460 PRINT "STARTING LINE";RETURN
470 PRINT "MID STRAIGHT-AWAY";RETURN
480 PRINT "APPROACHING LEFT TURN";L=L+Mc(U+U);RETURN
490 PRINT "MID LEFT TURN";L=L+McU+7;RETURN
500 PRINT "APPROACHING RIGHT TURN";L=L-Mc(U+U);RETURN
510 PRINT "MID RIGHT TURN";L=L-McU-7;RETURN
515 IF N=0IF A=0GOTO 520
516 IF A=Q N=N-1;GOTO 520
517 N=RND (5)+4
520 BOX 0,3,160,1,2;FOR X=-70TO Mc2-70STEP 2;BOX X,3,2,1,1;NEXT X;Q=A;CX=-7;CY=
-5;PRINT #1,A,".",N;GOSUB 660
540 FOR B=1TO 8;CY=-30;BOX -47,CY,66,8,2;GOSUB Bb10+550;FOR Z=1TO 70;IF TR(1)CY
=-30;PRINT "<HERE GOES>";RETURN
550 NEXT Z;NEXT B;GOTO 540

```

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puter too.

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```
560 PRINT "FLOOR IT";RETURN
570 PRINT "ACCELERATE";RETURN
580 PRINT "BRAKE";RETURN
590 PRINT "BRAKE HARD";RETURN
600 PRINT "SHARP RIGHT";RETURN
610 PRINT "RIGHT";RETURN
620 PRINT "SHARP LEFT";RETURN
630 PRINT "LEFT";RETURN
650 BOX 0,22,39,J,1;BOX L,20,3,5,2;BOX L,25,1,4,2;BOX L-3,19,1,3,2;BOX L+3,19,1
,3,2;BOX L+2,25,1,2,2;BOX L-2,25,1,2,2;RETURN
660 CY=-15;CX=55;PRINT #1,T;RETURN
```

Dave Martin  
3408 Braddock St.  
Kettering, OH 45420

DAREDEVIL You see a windshield and instruments. The car on the screen is located laterally according to your instructions. The available instructions will appear at the bottom in order, use TR(1) to choose.

# ARCADIAN

```

1 .
2 .
3 .THE PITS
4 .BY REX GOULDING
5 &(9)=167;&(11)=249;&(1)=249;FC=249;BC=119
10 CLEAR
17 PRINT
18 PRINT " THE PITS!"
19 PRINT
20 PRINT "ENTER NAME, THEN PRESS GO"
30 N=0
40 FOR A=1TO 10
50 B=KP
60 IF B=13GOTO 110
70 TV=B
80 N=N+1
90 @(A)=B
100 NEXT A
110 CLEAR
115 PRINT
120 PRINT "THANK YOU ",
130 FOR A=1TO N
140 TV=@(A)
150 NEXT A
160 FOR A=1TO 152
165 NEXT A
170 CLEAR
200 X=-76;Y=26
210 C=0
220 FOR A=1TO 100
230 BOX 75-RND (145),41-RND (77),7,7,1
240 NEXT A
243 PRINT "BEGIN"
244 BOX X,Y,1,1,3
246 BOX 72,-42,3,3,3
247 CX=-77;CY=-40
250 IF JX(1)GOTO 270
255 IF JY(1)GOTO 270
260 GOTO 250
270 PRINT
275 BOX 72,-34,3,3,3
280 BOX 72,-42,3,3,3
290 Y=Y+8
295 BOX 76,0,1,80,1
300 FOR A=1TO 10
310 BOX 75-RND (145),-27-RND (8),7,7,1
320 BOX X,Y,1,1,3
330 X=X+JX(1)*2;Y=Y+JY(1)*2
340 BOX X,Y,1,1,3
350 IF PX(X,Y)=0GOTO 410
360 MU="1"
370 NEXT A
380 C=C+1
400 GOTO 270
410 IF X=72IF Y=-42GOTO 560
420 FOR A=1TO 10
430 &(23)=255;&(21)=255
440 BC=40

```

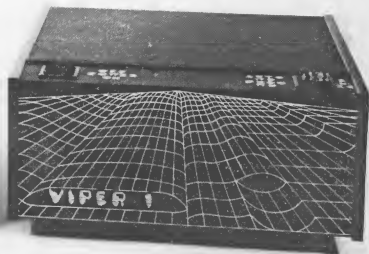
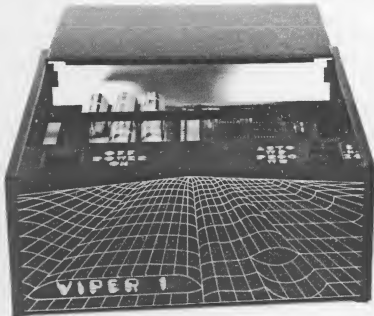
PITS The object of the game is to move the small dot in the upper left corner past the pits to the center of the medium-size box in the lower right corner. The clunker is that the pits move up the screen all the time and can catch you. Each time the screen rolls up is counted as a move. A successful trip in 16 moves is doing well.

T. R. Goulding, MMC  
CPO MESS  
USS CALIFORNIA CGN-36  
FPO New York, NY 09566

```

450 NEXT A
460 FOR A=1TO 30
470 BC=55
480 NEXT A
490 &(23)=0;&(21)=0
500 BC=119
510 PRINT "YOU BLEW IT ",
520 FOR A=1TO N
530 TV=@(A)
540 NEXT A
550 GOTO 620
560 PRINT "YOU WON ",
570 FOR A=1TO N
580 TV=@(A)
590 NEXT A
600 PRINT C," MOVES"
610 IF C<16PRINT "GOOD WORK !!!"
620 PRINT
630 PRINT "PLAY AGAIN? (PULL TRIGGER)"
640 FOR A=1TO 150
650 IF TR(1)GOTO 110
660 NEXT A
670 PRINT "NEW PLAYER? (PULL TRIGGER)"
680 FOR A=1TO 150
690 IF TR(1)CLEAR ;GOTO 17
700 NEXT A
710 PRINT "SO LONG FOR NOW"
720 :RETURN

```



The VIPER SYSTEM 1 is the first of a series of custom manufactured, quality products made for the Bally Home Computer/Professional Arcade. With this system, you can begin the evolution of your Bally from the Professional Arcade to a powerful graphic computer. The VIPER SYSTEM 1 is a lot more than just a 16K memory expansion. Features and capabilities are listed as follows: one dual position front panel select switch for starting the memory at either 8 or 24K. This will make it convenient for the user to copy any game cartridges and run them in extended RAM where they can be modified or copied to tape. Next, one dual position front panel switch for Auto-Write-Protect or Programmable Write-Protect. The Automatic Write-Protect mode allows the user to load Jay Fenton's excellent new 8K Extended Basic from tape, and then use the Basic to write programs in the remaining 8K. The Programmable-Write-Protect allows you to Write-Protect or Write-Enable the entire 16K RAM board with simple Basic statements. Next, the RAM board located inside the cabinet has two eight position DIP switch packs. Switch pack one enables 4, 8, or 16K bank selectable addressing, and switch pack two controls special bus functions to the Bally and selects either external or internal clocking. SYSTEM 1 also includes a fuse-protected +/- 5 volt and +/- 12 volt power supply. These voltages provide power to the RAM and keyboard interface circuitry. Also included is a heavy duty grounded AC line cord, and filtered AC outlet on the back that is controlled by the front panel switch. The SYSTEM 1 Interface Board provides the bus conversion from the Bally to the VIPER bus, plus a serial keyboard interface which will allow the use of a VIPER or other serialized ASCII keyboard with the system. It also includes one bus cable connecting the VIPER to the Bally. The RAM board and keyboard can be unplugged from the SYSTEM 1 and later plugged directly into the SYSTEM 5 without any changes because the equipment is completely (software and hardware) compatible. For those of you who are home-brewers, when the SYSTEM 1 is upgraded to a SYSTEM 5, the SYSTEM 1 cabinet, power supply, and bus interface card can be used to help prototype your own computer circuits. The entire system is housed in an attractive heavy duty black aluminum cabinet with simulated wood grain side panels and custom silk-screening. The dimensions are 18"x18"x4-1/4"

Due to the response received when originally advertised in past issues of the ARCADIAN, there have been several changes and improvements made to the System RAM card and Interface Card. Therefore, please refer to this advertisement and following advertisements for accurate product information, pricing, and availability. SYSTEM 1 is available now for the special introductory price of \$225, and a free Extended Basic (on tape and documentation) is included.

EPROM BURNING now available via Perkins Engineering. Send your machine code program on tape and \$20, and receive the program blasted into a 2532 or 2732. You will then be able to plug the program into the machine via the game cartridge slot (you have to make up the mechanical parts), just like the commercial ones. Anything can be loaded (up to 4K). Blue Ram owners can upload a Bally game, modify the rules, playing field, whatever, and have this personal modification made relatively permanent (since the EPROM can be erased). Contact Perkins Engineering, 1004 Pleasant Ave., Boyne City, MI. 49712

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---

ZIP CODE ADDITION came through this month - you'll see the additional four digits on my return address. Certainly not needed now, but its another step for the planned automation of some of the mails.

**RESUBSCRIPTION TIME AGAIN** The next issue will be the last for Volume Three, and Volume Four is currently scheduled to start in November. I run this paper on an Annual Volume basis, for ease in bookkeeping and calculating printing quantities. The subscription rate will again be \$12.50, and subscriptions are now being solicited.

**SACKCLOTH AND ASHES** heaped upon me by Steve Walters because I left out some data which would make the Bally Black Box (last issue) more understandable and useful. The required data is at the top of page 118.

**SERENDIPITY**, at least that's what Skip Atkinson expressed, telling me that the little music program by Mike Peace made a nice addition to the 'Old Bent Nose' program, both in the last issue. He suggests the following: Delete lines 1,2,3 and change 710 to: 710 RETURN then change 1090 to read

```
1090 @(A)=@(R);@(R)=0;GOSUB 1150;RETURN
```

and add

```
1150 FOR A=256TO 0STEP -4
1160 &(23)=A;&(21)=A;&(19)=200
1170 NEXT A;&(23)=0;&(21)=0;RETURN
```

**TELEPHONE GYRATIONS** Moving another step into the computerized communications world, I now have Ma Bell's "call forwarding" system, which allows me to transfer daytime incoming calls to another line. In doing so, the number here changed and is now 408-272-1060.

## HOW TO ADD SOUND EFFECTS TO DAREDEVIL

By George Moses

One of the most delightful games I've seen in recent months is the Daredevil game that appeared in the August issue of Arcadian. Unfortunately, because of sketchy directions it took awhile to fully understand how to play the game. It's really very simple. Look at the top of the screen for information of the road ahead and the lateral position of the car on the track. Look at the bottom of the screen for a choice of commands to make the car go faster, slower, right or left, with two intensities for each command. When the command you want to use shows on the screen, simply pull the trigger and watch what happens. If the command goes by before you can trigger it, just wait. It will come around again.

Daredevil lacked only one feature. Sound effects! I have fixed that with the following changes that'll make you think you're at the Indy race track with pistons popping and cars crashing into the wall...

You'll need to gain some memory space, so delete lines 1 through 4. Also, delete the NT=0 from line 10. We'll type that in later as a direct command. Now change the following lines:

```
210 FOR C=1770 22;&(C)=200;NEXT C;&(16)=255-M;&(20)
=100;IF A-M+80>0GOTO 320
270 FOR A=1670 23;&(A)=0;NEXT A;IF JY(1)RUN
```

Without a line number type the following:  
:PRINT;LIST;PRINT "RETURN;NT=0;RUN

Don't hit GO until you have your tape player running on RECORD for a few seconds. Press GO and the program will be saved on tape complete with the automatic :RETURN to turn off your interface, the NT=0 command and a RUN to autostart the program from tape. Once you learn to play this game you'll love it!!!

# ARCADIAN



```

1 .
2 .
3 .
4 .
5 .INVISIBLE WAR
6 .BY JAMES WINN
120 CLEAR ;FC=7;BC=0;NT=0
130 C=0;D=0;H=0;I=0
140 PRINT "DIFFICULTY
150 PRINT "1. EASY";PRINT "2. MEDIUM";PRINT "3. HARD
180 K=KN(1)C100+2
190 CX=-40;CY=-20;PRINT K
200 IF TR(1)GOTO 220
210 GOTO 180
220 E=K;CLEAR
230 PRINT "HOW MANY LASER BLASTS";PRINT "FOR YOUR SHIP
240 J=KN(1)C3+57
250 CX=-40;CY=-20;PRINT J
255 FOR N=1TO 400;NEXT N
260 IF TR(1)GOTO 280
270 GOTO 240
280 F=J;CLEAR
290 A=RND (76)-38
300 B=RND (76)-38
310 A=A+JY(1)B10
315 GOSUB 710
320 IF A>38A=38
330 IF A<-38A=-38
340 IF B<-38B=-38
370 IF B>A-10IF B<A+10GOTO 525
380 IF JY(1)=0GOTO 400
390 BOX -60,A,11,1,3;BOX -63,A,2,7,3;BOX -60,A,11,7,2
400 IF TR(1)GOTO 440
410 GOTO 310
440 BOX -60,A,11,1,3;BOX -63,A,2,7,3
460 LINE -50,A,4;LINE 60,A,3
470 &(21)=255;&(23)=255
480 LINE -50,A,4;LINE 60,A,3
485 BOX -60,A,11,7,2
490 &(21)=0;&(23)=0;I=I+1
500 IF A>B-10IF A<B+10B=A;H=1;GOSUB 700;GOSUB 800
505 IF I=FGOSUB 700;GOTO 910
508 IF I+10=FGOSUB 700;GOSUB 1000
510 IF TR(1)GOTO 510
520 GOTO 300
525 &(9)=33;FC=127;&(2)=7;&(3)=7
530 BOX 60,B,11,1,3;BOX 60,B,1,5,3
550 LINE 50,B,4;LINE -60,B,3
560 &(21)=255;&(23)=255
570 LINE 50,B,4;LINE -60,B,3
575 BOX 60,B,11,5,2
580 &(21)=0;&(23)=0
590 IF E=1GOTO 650
600 IF E=2GOTO 630
610 IF B>A-7IF B<A+7GOSUB 700;GOSUB 800
630 IF B>A-5IF B<A+5GOSUB 700;GOSUB 800
650 IF B>A-3IF B<A+3GOSUB 700;GOSUB 800
655 IF TR(1)GOSUB 710;GOTO 440

```

James Winn  
Box 98  
Boiling Springs, NC 28017

b = multiply x  
c = divide ÷





# ARCADIAN

```

660 GOTO 300
700 &(9)=50;&(2)=0;&(3)=0;FC=7;RETURN
710 &(9)=71;FC=7;&(0)=0;&(1)=0;&(2)=57;&(3)=57;RETURN
800 IF H=1GOTO 805
803 P=-60;Q=A;GOTO 810
805 P=60;Q=B
810 IF Q>33Q=33
812 IF Q<-34Q=-34
815 &(21)=255;&(23)=255;FOR L=1TO 15;BC=7;BC=0;FC=90;BOX P,Q,L,L,1;NEXT L
820 FOR L=1TO 13STEP 3;BOX P,Q,L,L,2;NEXT L;&(21)=0;&(23)=0;CLEAR
840 IF H=1C=C+1;GOTO 900
850 D=D+1
860 FOR N=1TO 200;NEXT N
900 H=0;B=50;CLEAR ;RETURN
910 FC=7;CX=-62;CY=40;PRINT C,D
912 CX=-20;CY=0;PRINT "GAME OVER
915 CY=-35;PRINT " TO PLAY PUSH JOYSTICK
917 FOR N=1TO 1000;NEXT N
920 IF JY(1)RUN
930 GOTO 920
1000 CLEAR ;NT=0;FC=126;BC=0
1010 CX=-60;CY=35;PRINT "10 LASER BLASTS LEFT
1020 FOR L=1TO 10
1030 CX=-30;CY=0;PRINT "CRITICAL!!!
1040 X=-30;Y=0;BOX X,Y,90,8,2
1050 &(17)=12;&(22)=250
1060 FOR M=1TO 100
1070 NEXT M
1080 &(17)=0;&(22)=0
1090 NEXT L;CLEAR ;RETURN

```

```

1 .
2 . SYMMETRICAL ART
3 . BY ROB ROSENHOUSE
4 . FOR SUPER SOFTWARE
5 .
6 . 6/10/1981
7 .
8 .
9 . RETURN ;NT=0;Z=RND (15)
10 CLEAR ;LINE 0,-40,4
20 FOR A=40TO -40STEP -Z
30 LINE 78,A,3;LINE 0,-40,4;LINE -78,A,3;LINE 0,40,4
70 LINE 78,A,3;LINE 0,40,4;LINE -78,A,3;LINE 0,-40,4
80 NEXT A
90 IF C=2GOTO 200
95 C=2
100 FOR A=2TO 82STEP Z.
110 BOX 0,0,A,84-A,3
120 NEXT A
150 FOR A=1TO 1000;NEXT A
160 BC=RND (256);FC=BC+12+86RND (32);RUN
200 Z=Z+2;IF Z<1Z=1
205 FOR A=40TO 0STEP -Z
210 LINE 0,A,4;LINE A,0,3;LINE 0,-A,3;LINE -A,0,3;LINE 0,A,3
220 NEXT A
230 C=1;GOTO 150

```

# ARCADIAN

## TELLING TIME

By Bob Hensel

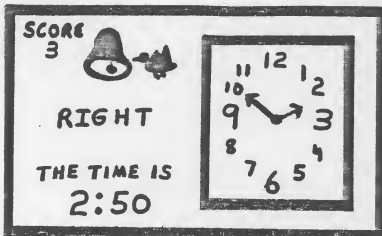
\$

```

5 :RETURN ;CLEAR ;NT=1;BC=249;FC=7;&(0)=249;&(1)=249;&(2)=126;&(3)=126;&(9)=8
4;PRINT "SCORE",;K=500
10 CY=25;CX=16;PRINT "11" 1
20 CY=29;CX=37;PRINT "12"
40 CY=13;CX=7;PRINT "10" 2
50 CY=0;CX=9;PRINT "9" 3
60 CY=-12;CX=13;PRINT "8" 4
70 CY=-24;CX=22;PRINT "7" 5
80 CY=-30;CX=39;PRINT "6"
130 BOX 40,0,80,80,3;BOX 40,0,74,74,3;BOX -40,42,4,2,1;BOX -40,40,6,2,1;BOX -40
,37,8,4,1;BOX -40,35,10,2,1;BOX -40,33,12,1,1
320 BOX -40,29,14,8,1;BOX -40,28,16,5,1;BOX -40,28,18,3,1;BOX -40,28,16,1,2;BOX
-40,28,14,3,2;BOX -40,28,10,5,2
340 BOX -40,28,3,3,1;BOX -40,30,1,2,1;GOTO 3000
500 %(20203)=256bV+H;CALL 20200;RETURN
890 LINE 39,0,4;GOSUB 900+M;LINE X,Y,E;MU=69;GOTO 990
900 X=39;Y=24;RETURN
905 X=53;Y=21;RETURN
910 X=60;Y=12;RETURN
915 X=63;Y=0;RETURN
920 X=60;Y=-12;RETURN
925 X=53;Y=-20;RETURN
930 X=39;Y=-24;RETURN
935 X=25;Y=-20;RETURN
940 X=18;Y=-12;RETURN
945 X=15;Y=0;RETURN
950 X=18;Y=12;RETURN
955 X=25;Y=21;RETURN
990 LINE 40,1,4;GOSUB 1000+R;IF M<30GOTO 995
992 X=X+2;IF R<9IF R>3X=X-4
994 Y=Y+2;IF R<6Y=Y-4
995 LINE X,Y,E;MU=67;GOTO J
1001 X=48;Y=12;RETURN
1002 X=53;Y=7;RETURN
1003 X=54;Y=1;RETURN
1004 X=53;Y=-7;RETURN
1005 X=48;Y=-12;RETURN
1006 X=40;Y=-14;RETURN
1007 X=30;Y=-12;RETURN
1008 X=25;Y=-7;RETURN
1009 X=26;Y=1;RETURN
1010 X=27;Y=7;RETURN
1011 X=30;Y=12;RETURN
1012 X=40;Y=14;RETURN
3000 R=RND (12);M=RND (12)b5-5;E=1;J=3020;GOTO 890
3020 CY=-32;PRINT "THE TIME IS";A=0;B=0
3026 A=A+JY(1);B=B+JX(1)b5;CY=-40;CX=-65;PRINT #1,A,":",#1,Bc10,#1,RM," ",;IF TR
(1)=0GOTO 3026
3050 CY=0;CX=-71;IF A=RIF B=MGOSUB 6000;GOTO 4000
3070 GOSUB 7000;PRINT #4,R,":",#1,Mc10,#1,RM;GOSUB 8000;GOTO 4000
4000 A=RND (12);B=RND (12)b5-5;CY=-32;PRINT "SET TIME TO";PRINT #4,A,":",#1,Bc10
,#1,RM," ",;

```

Bob Hensel  
8428 Ingleside Ave S.  
Cottage Grove, MN 55016



# ARCADIAN

```

4045 IF JY(1)=0IF JX(1)=0GOTO 4075
4046 E=2;J=4050;GOTO 890
4050 IF JX(1)=0R=R+JX(1)
4060 IF JY(1)=0M=M+JY(1)+5
4065 IF (R<1)+(R>12)=R=1
4067 IF (M<0)+(M>55)=M=0
4070 E=1;J=4075;GOTO 890
4075 IF TR(1)=0GOTO 4045
4080 CY=0;CX=-71;IF A=RIF B=MGOSUB 6000;E=2;J=3000;GOTO 890
4090 GOSUB 7000;E=2;J=4100;GOTO 890
4100 R=A;M=B;E=1;J=4110;GOTO 890
4110 GOSUB 8000;E=2;J=3000;GOTO 890
6000 PRINT "R I G H T";Y=50;FOR X=110TO 50STEP -3;H=X;Y=Y-2;U=Y;GOSUB K;GOSUB K;
NEXT X
6010 NT=15;FOR Z=1TO 5;GOSUB K;MU=70;GOSUB K;NEXT Z;BOX -40,0,70,10,Z;S=S+1;CY=3
0;CX=-65;NT=1;PRINT #1,S;CX=-77;RETURN
7000 PRINT "W R O N G";NT=10;U=50;H=110;FOR Z=1TO 5;GOSUB K;MU=66;MU=60;MU=48;GO
SUB K;NEXT Z;NT=1;RETURN
8000 FOR Z=1TO 1000;NEXT Z;BOX -40,0,75,40,2;RETURN

```

This is an educational game to help children learn to tell time. The computer will randomly set the clock and ask 'THE TIME IS' the hours and minutes can be entered by using JX(1) and JY(1). If the answer is right a bird will fly from the clock to the bell and ring it. One will be added to the score. If you are wrong the bird will appear and chirp 'COO COO! Pull TR(1) when you have completed an answer. The computer will then ask you to set the time to a random time. You can move the hands by using JX(1) and JY(1)

% (20200)=	-43		
2	53		
4	10240		
6	20210	24	68
8	-13871	26	7628
10	-1936	28	5460
12	-32690	30	32612
14	12288	32	2036
16	2432	34	2044
18	527	36	1022
20	-247	38	248
22	78	40	224
		42	0
		% (20244)=	0

The bird is drawn using the Graphic Char Maker by Rich Tietjens (see page 84 of the ARCADIAN) and enter:

ROW	LEFT	RIGHT
0	0	68
1	0	204
2	29	84
3	21	100
4	127	244
5	7	252
6	7	254
7	3	248
8	0	224
9	0	0

This segment is provided in case you want to try your hand at making the bird yourself. You don't have to, since the % (20200) data shown to the right will input the proper figure.

## TELLING TIME

To input this program to tape so it'll automatically load the listing plus the data, you'll have to load it in two sections. Just follow these directions.

Type the program into the computer then proofread. DO NOT RUN PROGRAM. Save it on tape by typing this command:

```
:PRINT ;NT=1;LIST ;PRINT "INPUT 1
```

Start your recorder on RECORD, then press GO. As soon as the program is done listing stop your recorder and RESET the computer, clearing the memory. Next, input this 2 line program:

```

10 CLEAR; FOR A = 20200TO 20244STEP 2:PRINT
  "%( ",#1,A," )=" ,:INPUT " " @ (A - 20200);NEXT A
20 A = KP; :PRINT ;NT=1;CLEAR ;TV = 0;TV = 1;FOR
  A = 20200TO 20244STEP 2:PRINT
  "%( ",#1,A," )=" ,@ (A - 20200);NEXT A;PRINT "RUN

```

Run this program and it will print "% (20200) =" on the screen. See the chart above and input -43. As each succeeding number comes up, input the number in the right column, pressing GO after each entry. After the listing of zero into address 20244, start your recorder on RECORD. Then press any key on your keypad and the data you have just input will be printed to tape automatically!

# ARCADIAN

```

1.
2 .KENO II 2.0
3 .(C)1981 MSK
4 PRINT "PROGRAM DISPLAYS KENO CARD AND CASH REMAINING. YOU PICK 1 TO 15 NUM
BERS USING HAND CONTROLLER.",
5 PRINT "NUMBER OF PICKS IS TALLIED NEXT TO GO. IF YOU PICK 1 TO 14 NUMBER
S, PICK GO TO START.
6 PRINT "THE COMPUTER PICKS AND DISPLAYS 20 NUMBERS AND CALCULATES PAYOFF
F.",
7 PRINT " TO SEE PAYOFF TABLE PUSH 'c', IF KP="c" GOTO 2000
8 PRINT
9 INPUT "STAKE" C
10 T=0: CLEAR :GOSUB 900: C=C-1: CY=-33: CX=43: PRINT "$", #5, C,
20 GOSUB 800: IF N<81 GOSUB 700: IF T<15 GOTO 20
30 GOSUB 600: GOSUB 500: IF H=0 B=0: GOTO 40
35 B=@(R+H-1): C=C+B
40 CX=-59: PRINT "OF", #3, T, "GOT", H, "PAYS$", #5, B,
45 IF C<1 STOP
50 IF TR(1) GOTO 10
60 GOTO 50
500 R=0: IF T=1 RETURN
510 FOR S=1 TO T-1: R=R+S: NEXT S: RETURN
600 H=0: FOR U=1 TO 20: V=RND (80)-1: V=V*10: W=RM: X=-73+W*16: Y=39-U*9: IF PX(X-6, Y+4
)=0 GOTO 680
610 IF PX(X, Y)=0 U=U-1: GOTO 690
620 H=H+1
630 GOTO 585
680 IF PX(X, Y) U=U-1: GOTO 690
685 BOX X, Y, 11, 7, 3
690 NEXT U: RETURN
700 IF PX(X-6, Y+4) T=T+1: GOTO 720
710 T=T-1
720 CY=-33: CX=-59: PRINT #2, T, : RETURN
800 X=-73: Y=39: BOX X, Y, 13, 9, 3
810 I=X: J=Y: X=X+JX(1)*16: Y=Y+JY(1)*9: X=X+16*(X<-75)-16*(X>75): Y=Y+9*(Y<-25)-9*(
Y>40)
815 IF X=-73 IF Y=-24 IF JY(1)=-1 Y=-33
820 BOX I, J, 13, 9, 3: BOX X, Y, 13, 9, 3: IF TR(1)=0 GOTO 810
830 N=(X+73)*16+1-(Y-39)*9*16: RETURN
900 FOR Y=0 TO 7: CY=39-Y*9: FOR X=1 TO 10: CX=-91+X*16: PRINT #2, X+Y*10, : NEXT X: NEXT
Y: CY=-33: CX=-75: PRINT "GO", : RETURN
2000 PRINT : FOR T=1 TO 15: GOSUB 500: FOR Q=1 TO T: PRINT #3, "PICK", T, " GET", Q, " WIN
$", #5, @(R+Q-1): NEXT Q: NEXT T: GOTO 9
3000 : PRINT : LIST : FOR A=0 TO 119: PRINT "@(", #1, A, ")=", @(A): NEXT A: PRINT ": RETURN
: NT=1": : RETURN : NT=1
>

```

Mark Keller  
9536 Shumway Dr.  
Orangevale, CA 95662

## KENO

To more easily input the arrays to memory we have included an array-building loop. Type in the KENO program, then proof-read your listing. DO NOT RUN THE PROGRAM.

Type in this program without a line number:  
**CLEAR :FOR A=0 TO 119:PRINT"@(",#1,A,")=",";INPUT  
 " " @ (A);NEXT A  
 GO**

The screen will prompt you for each data entry with "@0=", etc. Just input the values from the chart (only the numbers to the right of the equals sign) pressing GO after each entry until you have input all the data through array address @119.

When the entries are complete, start your tape recorder in the RECORD mode. Then type:

**GOTO 3000  
GO**

Your program and the array you have just created will be saved on tape automatically!


# ARCADIAN

@(0)=3	@(15)=0	@(30)=0	@(45)=0	@(60)=10	@(75)=2400
@(1)=0	@(16)=0	@(31)=0	@(46)=0	@(61)=75	@(76)=13000
@(2)=12	@(17)=1	@(32)=9	@(47)=0	@(62)=380	@(77)=25000
@(3)=0	@(18)=3	@(33)=90	@(48)=0	@(63)=2000	@(78)=0
@(4)=1	@(19)=0	@(34)=1650	@(49)=2	@(64)=12500	@(79)=0
@(5)=42	@(20)=1800	@(35)=18000	@(50)=20	@(65)=19500	@(80)=0
@(6)=0	@(21)=0	@(36)=0	@(51)=142	@(66)=0	@(81)=0
@(7)=1	@(22)=0	@(37)=0	@(52)=1000	@(67)=0	@(82)=0
@(8)=4	@(23)=0	@(38)=0	@(53)=4500	@(68)=0	@(83)=2
@(9)=113	@(24)=0	@(39)=0	@(54)=19000	@(69)=0	@(84)=16
@(10)=0	@(25)=20	@(40)=3	@(55)=0	@(70)=0	@(85)=78
@(11)=0	@(26)=410	@(41)=45	@(56)=0	@(71)=6	@(86)=700
@(12)=1	@(27)=8100	@(42)=335	@(57)=0	@(72)=28	@(87)=3600
@(13)=9	@(28)=0	@(43)=4700	@(58)=0	@(73)=200	@(88)=9000
@(14)=820	@(29)=0	@(44)=18500	@(59)=0	@(74)=850	@(89)=25000

@(90)=25000	@(105)=0
@(91)=0	@(106)=0
@(92)=0	@(107)=0
@(93)=0	@(108)=0
@(94)=0	@(109)=0
@(95)=0	@(110)=2
@(96)=3	@(111)=8
@(97)=8	@(112)=21
@(98)=32	@(113)=75
@(99)=300	@(114)=240
@(100)=800	@(115)=2400
@(101)=2500	@(116)=8000
@(102)=12000	@(117)=25000
@(103)=25000	@(118)=25000
@(104)=25000	@(119)=25000

CONTEST ENTRANTS in this issue were Bob Hensel, with the Telling Time educational program, and Mark Keller with Keno. Judge George Moses was able to respond with both his scores, and some sub-programs that should make these programs a little easier to handle. George is one of the unsung heroes that help my job along. One other hint with Keno, if you decide to choose less than the maximum 14 numbers, run the cursor down to the GO character with the hand controller and press the trigger while there. The departing judge this time will be Craig Anderson, and many thanks...

BLUE RAM ENHANCEMENTS are under way. The next bit of hardware to emerge will be the Extended Basic language in a ROM cartridge. The next issue should have the advertising for this, and deliveries are expected in 30 days.



TAPE # 3

815.96

3328 Red Fox Run

Warren, Ohio 44485

CA.

AZ.

SC.

MI.

IN.

RI.




PA.




25




36

25

36

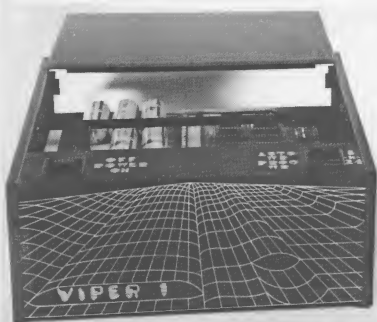




### THE GREAT AMERICAN JIGSAW

Everybody knows where California, Texas and Florida are located, but can you identify the state which the computer has selected at random and drawn in the lower left hand corner of the map? It is surely easy with seven chances from which to pick, but if you really need help the computer will assist you by showing its exact location. 10 pts for the geographer and 5 pts. for the duffer. We give you the three easy states and the other 46 go together like a jigsaw puzzle. Side 2 gives you two graphic features and asks for major cities. Red, White and Blue graphics for a patriotic affect. This is the finest in educational software from:

**ESOTERICA LTD.**  
**3328 Red Fox Or.**  
**Warren, Ohio 44485**



The VIPER SYSTEM 1 is the first of a series of custom manufactured, quality products made for the Bally Home Computer/Professional Arcade. With this system, you can begin the evolution of your Bally from the Professional Arcade to a powerful graphic computer. The VIPER SYSTEM 1 is a lot more than just a 16K memory expansion. Features and capabilities are listed as follows: one dual position front panel select switch for starting the memory at either 8 or 24K. This will make it convenient for the user to copy any game cartridges and run them in extended RAM where they can be modified or copied to tape. Next, one dual position front panel switch for Auto-Write-Protect or Programmable Write-Protect. The Automatic Write-Protect mode allows the user to load Jay Fenton's excellent new 8K Extended Basic from tape, and then use the Basic to write programs in the remaining 8K. The Programmable-Write-Protect allows you to Write-Protect or Write-Enable the entire 16K RAM board with simple Basic statements. Next, the RAM board located inside the cabinet has two eight position DIP switch packs. Switch pack one enables 4, 8, or 16K bank selectable addressing, and switch pack two controls special bus functions to the Bally and selects either external or internal clocking. SYSTEM 1 also includes a fuse-protected  $\pm 5$  volt and  $\pm 12$  volt power supply. These voltages provide power to the RAM and keyboard interface circuitry. Also included is a heavy duty grounded AC line cord, and filtered AC outlet on the back that is controlled by the front panel switch. The SYSTEM 1 Interface Board provides the bus conversion from the Bally to the VIPER bus, plus a serial keyboard interface which will allow the use of a VIPER or other serialized ASCII keyboard with the system. It also includes one bus cable connecting the VIPER to the Bally. The RAM board and keyboard can be unplugged from the SYSTEM 1 and later plugged directly into the SYSTEM 5 without any changes because the equipment is completely (software and hardware) compatible. For those of you who are home-brewers, when the SYSTEM 1 is upgraded to a SYSTEM 5, the SYSTEM 1 cabinet, power supply, and bus interface card can be used to help prototype your own computer circuits. The entire system is housed in an attractive heavy duty black aluminum cabinet with simulated wood grain side panels and custom silk-screening. The dimensions are 18"x18"x4-1/4"

Due to the response received when originally advertised in past issues of the ARCADIAN, there have been several changes and improvements made to the System RAM card and Interface Card. Therefore, please refer to this advertisement and following advertisements for accurate product information, pricing, and availability. SYSTEM 1 is available now for the special introductory price of \$225, and a free Extended Basic (on tape and documentation) is included.

# ADS

The "FALL 1981 BALLY Professional ARCADE Software and Hardware SOURCEBOOK" will be available October 15th. Over 90, 8 1/2 by 11 pages with pictures. Includes the following Sections: System Summaries; Complete Software and Hardware Index; ARCADIAN Program Descriptions; THE BASIC EXPRESS Program Descriptions; Software Sources; Hardware Sources; Dealer List; Repair Services; Manuals Available; and User Groups. The ARCADIAN and THE BASIC EXPRESS entries are current thru the September editions of the Newsletters.

RMH Enterprises  
635 Los Alamos Ave.  
Livermore, CA 94550

WANTED ARCADE unit. please send details and asking price to Michael Vogel, PSC #2 Box 11466, APO S. F. CA 96367

For Sale Bally Arcade. Comes with 6 controllers, Basic, Audio Interface, and the following videocodes: 2001,2002,2003,2004,2005,2009,2010, 3001,3002,3005, 4001,4002, 5001,5002. Also comes with service manual, Volumes 1 & 2 of the ARCADIAN and Cursor and partial Three for both. Machine is a little over two years old and never had a problem. \$350 or best offer. Duane Olexa, P.O.Box 212, Neffs, OH, 43940 614-676-3378

Bally Booster T Shirts. Airbrushed in full color \$8 plus \$1 post. and handling. Send sizes and check to Don Gladden, 59400 Nine Mile Rd., South Lyon, MI 48178 Custom shirts also done - call for prices 313-437-3984

For Sale Bally Arcade with 2 hand controllers, Basic, Tape Interface, Baseball, Blackjack, Seawolf, Panzer Attack, Letter Match, Elementary Math, Professional Keyboard -(needs interface, with schematics, paid \$70.) Any reasonable offer accepted. Bally works ok. Wm. Bender 806-403 Saratoga Ave., San Jose, CA 95129

≡ 1 2 0 ≡

ARCADIAN  
Robert Fabris, Zapped  
3626 Morrie Dr.  
San Jose, CA 95127-9990



**NEW VIDEOGAME SCHEDULE** These three Videocades are now available at outlets: #2011 Galactic Invasion; #2014 Grand Prix/Demolition Derby; #4004 Biorythm. We should see Space Fortress and Pirate's Chase in October, and then Music Maker 1 in November. Then Bowling, Pac-Man, Wizard of War, and Coloring Book are due in January. Others in work include Zap, Checkers and Chess. The names of those that are full-size arcade games will change a little bit to provide some differentiation.

The new AstroVision Basic should be out by the time you receive this. If you have difficulty in purchasing any of the above cartridges from your local sales outlet, drop me a line with a \$30 deposit for each cartridge desired.

**RESUBSCRIPTIONS** This is the last issue of the year, and so a subscription renewal is necessary.

→ The rate is again \$12.50 for the full year, Volume IV.. ←

**RETROSPECTION** The current volume, of 130 pages, surpasses all of our previous efforts, resulting in a per page cost of 9 cents. • We mechanised a considerable portion of the production, so that only a minimal amount of hand labor is necessary to get the Newsletter out to you. • We had a booth at the West Coast Computer Faire and met a lot of subscribers, and added a goodly number to our rolls - as well as giving a large number of urchins a chance to play the Galaxian cartridge. • We started the \$100 per issue contest for the best program of the month, and have made four disbursements to date. Initially agreed to be funded by Dan Dawson of AstroVision, these payments have so far been totally funded by the ARCADIAN. • In the area of subscriber-operations, the Blue Ram memory addition was produced to allow subscribers greater scope for their programs. • New hardware was announced and deliveries started on the Viper memory addition system. • The Blue Ram memory addition people are providing an EPROM-burning service, and the new Extended Basic is available in both ROM and tape versions. • At least two people are working on programs to be available on PROMs for our enjoyment. • And Dick Belton is making the Bally self-check system (BALCHECK) available. So there have been a number of third-party activities to make this year better than last.

**SATISFACTION** One of the more pleasant aspects of producing this Newsletter is experiencing the expansion of our capabilities. We are all learning together, and this education is one of the major reasons for the ARCADIAN. The item that brings this to the forefront at the moment is Bob Weber's character making program. Back on page 83, Rich Tietjens showed us how to create a graphic character by manually calculating the inputs to his GRAPHIC CHARACTER MAKER program. Bob Hensel, in his TELLING TIME program on p.114 used the technique to create his bird character - and now the evolutionary processes used by our subscribers has provided us all with the technique that allows the computer to do all the work. And we all benefit.

**CONTEST ENTRANTS** this month are: MATCH by Ed Groebe and REBOUND by Dave Martin. The retiring judge this time is George Moses.

# ARCADIAN

```

2 . MATCH
5 . ED G
10 CLEAR ; BC=56;FC=55
14 CY=0;CX=-30;PRINT "M A T C H"
15 FOR C=1TO 500;NEXT C;CLEAR
20 CY=0;PRINT "      TRY TO MATCH";PRINT ;PRINT "      PAIRS OF NUMBERS !"
30 PRINT ;PRINT ;PRINT "      KEY IN LETTERS";PRINT ;PRINT "      FOR YOUR GUESS !"
32 PRINT ;PRINT ;PRINT "      1 OR 2 PLAYERS ?"
34 P=KP
37 IF P>50GOTO 34
38 IF P<49GOTO 34
39 CX=0;TV=P;Q=P-48
40 PRINT
60 K=0;J=0;S=0;T=0;CLEAR
80 CY=0;CX=-15;PRINT "WAIT !"
100 FOR Z=0TO 85;@(Z)=0;NEXT Z
130 U=RND (10)-1
150 IF @(U)=1GOTO 130
160 @(U)=1;GOTO 170
170 FOR Z=1TO 2
175 W=RND (20)
180 IF @(64+W)>0GOTO 175
185 @(64+W)=U
190 NEXT Z
192 FOR Z=0TO 9;IF @(Z)=0GOTO 130
196 NEXT Z;CLEAR
200 X=-60;Y=30;Z=64
210 FOR Y=30TO -30STEP -20
220 FOR X=-60TO 60STEP 30
230 Z=Z+1;CX=X;CY=Y;TV=Z
250 BOX X,Y,20,18,3
260 NEXT X;NEXT Y
300 FOR P=1TO Q
302 CY=0;CX=75;PRINT #0,P
305 A=0
310 IF P=1T=T+1;BC=8;FC=7
311 IF P=2S=S+1;BC=80;FC=7
320 W=KP
325 IF W<65GOTO 320
326 IF W>84GOTO 320
327 IF @(W)=10GOTO 320
330 GOSUB 400+W
340 A=20
350 V=KP
355 IF V<65GOTO 350
356 IF V>84GOTO 350
357 IF V=NGOTO 350
358 IF @(V)=10GOTO 350
360 GOSUB 400+V
370 GOTO 600
465 X=-60;Y=30;GOTO 490
466 X=-30;Y=30;GOTO 490
467 X=0;Y=30;GOTO 490
468 X=30;Y=30;GOTO 490
469 X=60;Y=30;GOTO 490
470 X=-60;Y=10;GOTO 490
471 X=-30;Y=10;GOTO 490

```

The object of this board game, for either one or two players, is to select the pairs of cards (A to T) which have matching numbers (0 to 9). As letter guesses are entered on the key-pad the cards are "turned over" to reveal the numbers. If a match is made the two cards are removed from the board and the player tries two more cards. If a match is not made the cards are turned down again.

If there are two players, they take turns guessing two cards at a time. At the end of the game the number of pairs matched for each player is shown. If there is just one player the number of tries needed to complete all 10 matches is shown at the end. The challenge is to have as few tries as possible--10 would be a perfect score.

Both the color and a number of the right of the screen indicate which player should enter a letter (blue is #1, red is #2). A short instruction at the beginning explains what to do.

Ed Groebe  
12046 Flambeau Drive  
Palos Hills, IL 60463

```

472 X=0;Y=10;GOTO 490
473 X=30;Y=10;GOTO 490
474 X=60;Y=10;GOTO 490
475 X=-60;Y=-10;GOTO 490
476 X=-30;Y=-10;GOTO 490
477 X=0;Y=-10;GOTO 490
478 X=30;Y=-10;GOTO 490
479 X=60;Y=-10;GOTO 490
480 X=-60;Y=-30;GOTO 490
481 X=-30;Y=-30;GOTO 490
482 X=0;Y=-30;GOTO 490
483 X=30;Y=-30;GOTO 490
484 X=60;Y=-30;GOTO 490
490 GOTO 500+A
500 BOX X,Y,18,16,2
510 CX=X;CY=Y;PRINT #0,@(W)
517 RETURN
520 BOX X,Y,18,16,2
525 CX=X;CY=Y;PRINT #0,@(U)
540 RETURN
600 IF @(W)=@(U)GOTO 700
620 IF @(W)*@(U)GOTO 800
700 @(W)=10;@(U)=10
710 IF P=1 K=K+1
711 IF P=2 J=J+1
720 IF K+J=10GOTO 900

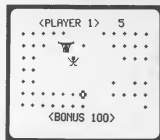
```

```

730 A=450
740 GOSUB 400+W
750 GOSUB 400+U
790 GOTO 305
800 A=350
820 GOSUB 400+W
825 A=360
830 GOSUB 400+U
835 NEXT P
840 GOTO 300
850 BOX X,Y,20,18,2
855 CX=X;CY=Y;TU=W;GOTO 880
860 BOX X,Y,20,18,2
865 CX=X;CY=Y;TU=U
880 BOX X,Y,20,18,3;RETURN
900 CLEAR
920 CY=0;CX=-24
930 PRINT " GAME OVER"
931 IF Q=2GOTO 970
935 PRINT ;PRINT ;PRINT " ",T," TRYS !"
940 GOTO 15
950 BOX X,Y,20,20,2
960 RETURN
970 PRINT ;PRINT ;PRINT " #1 MATCHED",K
980 PRINT " #2 ",J
990 GOTO 15

```

## LOOKOUT for the BULL!



### TAPE 10

THE CHALLENGE NEVER ENDS, BECAUSE THE LEVEL OF PLAY IS BASED ON YOUR SCORE. YOU ARE IN A FIELD PICKING CLOVER ONE BY ONE FROM TIME TO TIME A LARGE (BONUS) CLOVER POPS UP. THIS SOUNDS EASY BUT WE'VE ALSO PUT A BULL IN THIS FIELD WITH YOU AND HE IS GETTING MAD BECAUSE YOU'RE PICKING HIS CLOVER. THE MORE YOU PICK THE MADDER HE GETS AND THE FASTER HE RAGES. HE WILL GET YOU, SO WE'VE ALSO GIVEN YOU UP TO TEN LIVES. BELIEVE ME YOU WILL NEED THEM. THE GAME CAN BE PLAYED WITH ONE TO FOUR PLAYERS ON INDIVIDUAL CONTROL HANDLES KEEPS SCORE AND LEVEL OF PLAY FOR EACH PLAYER, CHANGES COLOR AS HIGHER LEVELS ARE REACHED. SIDE ONE HAS MACHINE GRAPHIC BULL AND MAN. SIDE TWO IS FOR THE MORE ADVANCED PLAYER. TAPE IS RECORDED IN BOTH BALLY AND ASTROVISION BASIC (THE COMPUTER SELECTS THE PROPER ONE). THIS IS PROBABLY THE MOST FUN AND CHALLENGING GAME EVER WRITTEN IN BASIC. LOADS QUICKLY. \$10.95

# ARCADIAN



```

1 . REBOUND
2 . BY DAVE MARTIN
10 H=0;S=0;G=20;E=75;F=35;M=1000;R=100;N=10;GOTO 180
20 L=(K#2)b127;(&2)=L;(&3)=L;L=116+(&K=2);BC=L;(&0)=L;(&1)=L;FC=0;X=5;Y=5
30 CLEAR ;(&9)=212;FOR D=250 -255STEP -N;FOR C=-65TO 65STEP N
35 BOX C,D,3,3,1;BOX C,D,5,1,1;BOX C,D,1,5,1;NEXT C;NEXT D
40 NT=S;A=RND (3)b5-N;B=RND (3)b5-N;IF A=0IF B=0GOTO 40
50 CY=40;CX=-F;PRINT "\GET READY\^";FOR Z=0TO 800;NEXT Z;BOX 0,40,160,8,2;I
F KGOSUB 250
60 BOX X,Y,5,5,1;FOR T=-84TO 30bM;X=X+A;Y=Y+B;IF (ABS(X)=E)+(ABS(Y)=F)GOTO R
70 P=P+PX(X,Y+2);FOR Z=0TO W;IF X=IIF Y=JGOTO 280
80 IF P=84S=S+Mb(K+1)+8400-Tc2b5;GOTO 140
90 NEXT Z;BOX X,Y,5,5,3;BOX X-A,Y-B,5,5,2;NEXT T;GOTO 130
100 BOX X,Y,5,5,3;BOX X-A,Y-B,5,5,3;IF ABS(X)=E A=Xc15;B=JY(1)b5
110 IF ABS(Y)=F B=Yc7;A=JX(1)b5;IF ABS(X)=EGOTO 300
120 MU=E;T=T-1;NEXT T
130 (&22)=111;FOR Z=30TO 150;(&17)=Z;(&18)=Z+13;NEXT Z;(&22)=0;(&17)=0;(&18)=0;
S=S+PbR-(84-ABS(T))c2b5;GOTO 180
140 CLEAR ;(&9)=50;BC=161;FC=134;CY=8;NT=3;PRINT #15,(K+1)bM;CX=-35;PRINT "+ B
ONUS! ++
150 IF K<2CX=-F;PRINT "SCORE:",#6,S
160 (&21)=15;FOR Z=1TO 25;FOR Q=15TO G;(&19)=Q;NEXT Q;NEXT Z;(&21)=0;(&19)=0
170 IF K<2K=K+1;P=1;GOTO G
180 CLEAR ;(&9)=50;BC=0;FC=0;NT=0;PRINT " YOUR SCORE HIGH SCORE
190 PRINT " -----
200 IF S>H H=S
210 PRINT #8,S,#14,H;CY=0;PRINT "BALL SPEED-a
220 CX=-14;CX=-36;PRINT "R U";CX=-24;PRINT "E O N";CX=-12;PRINT "B
D";CY=-39
225 PRINT " - THE MAD PROGRAMMER";BC=8;FC=7;CY=0
230 BOX 0,-39,126,9,3;W=(&28)c50;CX=0;PRINT #2,W;IF TR(1)K=0;S=0;P=1;I=1;J=1;G
OTO G
240 GOTO 230
250 I=RND (13)bN-E;J=RND (6)bN-F;IF (I=5)+(J=5)GOTO 250
260 IF (I=J)+(I+J=10)GOTO 250
265 IF K#2BOX I,J,3,1,2;BOX I,J,1,3,2
270 FOR U=1TO 16;BOX I,J,5,5,3;MU=R;NEXT U;RETURN
280 IF P#84GOTO 130
290 S=S+Mb(K+1)+8400-Tc5b5;GOTO 140
300 CY=36;NT=0;(&9)=-1;BC=142;PRINT " _BALL IS STUCK IN CORNER!!";GOTO 130

```

Dave Martin  
3408 Braddock Street  
Kettering, OH 45420

REBOUND is a game of skill for one player. Turn knob to select ball speed (0-fast 5-very slow) and pull trigger. You try to clear as many diamonds as possible off the board using a ball that may only be controlled as it bounces off the wall. Use joystick when ball approaches a wall to tell it to bounce (45 degrees) on the right, left, up, or down. You must hold joystick position until after ball has bounced off the wall.

If you clear the board, you are challenged to clear a second and third board. On the second board, one diamond is marked and will flash before you begin. If you do not erase this one last, the game is over. On the third board, one diamond will flash, but is not marked. You must remember this one to erase it last!

A couple more catches : points are deducted for crossing a path you have already travelled, and finally, you cannot bounce into a corner, or the game ends.

# ARCADIAN

```

1 .
2 .
3 .
4 . GOBBLE
5 . BY BOB WISEMAN
10 GOTO 900
100 C=28-((P-1)-6)*10b15;R=Rb15-72;RETURN
110 FOR P=1TO 2;GOSUB 100;W=@(P-1);V=@(W);@ (W)=0;IF U@(P+1)=@(P+1)+U;FOR X=1TO
U;MU=87;NEXT X
113 IF U L=L-1;IF L=0GOTO 1000
115 BOX R,C,15,15,1;NEXT P
120 CX=Z;NT=0;PRINT @(2),@(3), " ",NT=2
125 FOR P=1TO 2
130 B=JX(P);IF BGOTO 150
140 B=-10bJY(P)
150 @(P+3)=B;IF BGOSUB 100;X=Bc5;Y=Rb2;BOX R+Y,C-X,13-XbX,13-YbY,2
160 NEXT P;FOR P=1TO 2;GOSUB 100;B=@(P+3)
170 IF BGOSUB 100;GOSUB 300;GOSUB 100;GOSUB 400
180 NEXT P;M=M+1
200 GOTO 110
300 BOX R,C,15,15,2;IF B=0RETURN
305 X=P-1;A=B+@(X);IF (A<6)+(A>55)A=@(X)
320 IF @(2-P)=A A=@(X)
330 @(X)=A;RETURN
400 IF B#10BOX R,C-6,15,3,1
405 IF B#-10BOX R,C+6,15,3,1
410 IF B#-10BOX R,C-6,15,3,1
420 IF B#1BOX R+6,C,3,15,1
430 IF B#-1BOX R-6,C,3,15,1
440 RETURN
800 BOX R,C,7,7,1;BOX R-1,C+2,2,2;D=@(A);IF D>1BOX R+2,C-1,2,2,2
810 IF D>2BOX R+2,C+2,2,2,2
820 IF D=4BOX R-1,C-1,2,2,2
825 MU=Db15
830 RETURN
900 CLEAR ;&(10)=16;CY=40;Z=-60;CX=Z;P=1
905 L=50;PRINT "ONE MOMENT PLEASE",
910 FOR A=6TO 55;@(A)=RND (4);@(0)=A;GOSUB 100;GOSUB 800;NEXT A
920 @(0)=28;@(1)=33;@(2)=0;@(3)=0;CX=Z
930 PRINT "GET READY -- SET!",
940 FOR X=16TO 176;&(10)=X;FOR Y=1TO 4;NEXT Y;NEXT X
950 CX=Z;PRINT "GO!! GO!! GO!!",
990 GOTO 110
1000 CX=Z;PRINT "STOP!! STOP!! ",
1005 CX=Z
1010 IF @(2)=@(3)PRINT "THIS GAME IS DRAWN",;STOP
1020 IF @(2)>@(3)PRINT "PLAYER ONE WINS",
1030 IF @(2)<@(3)PRINT "PLAYER TWO WINS",
1040 STOP
1060 PRINT ABS(@(2)-@(3)),;STOP

```

Bob Wiseman  
 118 St. Andrews Drive  
 Cincinnati, OH 45245

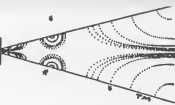
THIS IS A TWO PLAYER GAME PLAYED ON A TEN BY FIVE FIELD. THE OBJECT OF THE GAME IS TO HAVE YOUR GOBBLE GOBBLE UP MORE SQUARES THAN YOU OPPONENT. WHEN PLAY BEGINS, USE THE JX AND JY TO DIRECT YOUR GOBBLE AROUND THE SCREEN. EACH PRINTED SQUARE IS WORTH ONE, TWO, THREE, OR FOUR POINTS DEPENDING UPON HOW MANY DOTS ARE THERE. THE GAME ENDS WHEN THE LAST SQUARE IS EATEN.

# ARCADIAN

```

1 .BOO
10 CLEAR ;FC=133;BC=0;H=1;CX=-11;CY=6;PRINT "HAPPY";CX=-25;CY=-6;PRINT "HALLOW
EEN!";GOSUB 70;GOTO 200
15 U=3;Q=0;RETURN
20 LINE 0,Yb40,4;LINE Xb2,Yb40,1;LINE Xb4,Yb38,1;LINE Xb6,Yb35,1;LINE Xb8,Yb31
,1;LINE Xb9,Yb26,1
21 LINE Xb10,Yb20,1;LINE Xc5b53,Yb10,1;LINE Xb11,0,1;RETURN
30 LINE X,Y,4;LINE X-10,Y-20,3;LINE X+10,Y-20,3;LINE X,Y,3;RETURN
40 FOR T=1TO N:11;NEXT T;RETURN
46 BOX 0,-8,9,15,3;RETURN
50 NT=20;MU=62;BOX -25,16,23,21,1;MU=59;NT=3;GOSUB 40;LINE -35,5,4;LINE -25,25
,3;LINE -15,5,3;GOSUB 40;RETURN
60 LINE 0,-17,4;LINE Xb3,-15,3;LINE Xb5,-13,3;LINE Xb8,-11,3;LINE Xb5,-26,3;LI
NE Xb3,-28,3;LINE 0,-30,3;RETURN
70 NT=150;FOR N=0TO 3;MU=@(N);NEXT N;NT=0;RETURN
80 LINE 0,40,4;LINE Xb3,38,1;LINE Xb6,35,1;LINE Xb8,25,1;LINE Xb9,15,1;LINE Xb
9,5,1;LINE Xb8,-5,1
82 LINE Xb6,-15,1;LINE Xb5,-15,1;LINE Xb5,-30,1;LINE Xb4,-35,1;LINE Xb3,-40,1;
LINE 0,-42,1;RETURN
85 U=3;FOR N=-46TO 46;Q=Nc4;IF RM=0GOSUB 100
86 LINE N,6,4;LINE 0,43,1;NEXT N;RETURN
87 FOR X=-1TO 1STEP 2;BOX Xb18,9,13,15,3;NEXT X;GOSUB 46;BOX 0,-25,35,13,3
88 FOR X=-14TO 14STEP 7;FOR Y=-28TO -22STEP 6;BOX X,Y,5,5,3;NEXT Y;NEXT X;RETU
RN
90 GOSUB 15;A=Z;B=Z;FOR X=-54ZTO 0;FOR Y=ATO 43;IF PX(X,Y) A=Y;GOTO 94
92 NEXT Y
94 FOR Y=BTO -43STEP -1;IF PX(X,Y) B=Y;GOTO 97
96 NEXT Y
97 Q=Q+1;IF Q=2 Q=0;GOSUB 100
98 LINE X,A,4;LINE X,B,H;LINE -X,A,4;LINE -X,B,H;IF H=2RETURN
99 NEXT X;NT=0;RETURN
100 U=U+1;IF U>11 U=4
105 NT=20;MU=@(U);NT=0;RETURN
200 FOR X=-5TO 5STEP 10;FOR Y=-1TO 1STEP 2;GOSUB 20;NEXT Y;NEXT X;LINE -7,40,4;
LINE 0,43,1;LINE 14,43,1;LINE 0,40,1;Z=0;GOSUB 90
300 FOR G=1TO 6;N=3;GOSUB 40;GOSUB 100;NEXT G
500 Y=25;X=-Y;GOSUB 30;X=Y;GOSUB 30;Y=10;X=0;GOSUB 30;X=5;GOSUB 60;X=-5;GOSUB 6
0;N=5;GOSUB 40;GOSUB 50;GOSUB 50;GOSUB 50
600 GOSUB 70;BOX 0,-21,82,21,1;FOR N=0TO 2STEP 2;BOX 0,-25,17-N,15-N,3;NEXT N
660 N=25;GOSUB 40
700 CLEAR ;FC=11;GOSUB 85;BOX 0,-18,93,51,1;BOX 25,25,9,25,1;GOSUB 87;BOX 34,-3
1,15,25,3;BOX 30,-33,2,3;BOX -34,-26,15,11,3
740 BOX 0,0,149,87,3;N=5;GOSUB 40;H=2;GOSUB 15;FOR X=-75TO -27;A=43;B=-A;GOSUB
97;NEXT X;B=23
752 GOSUB 15;FOR X=-26TO 0;B=23;GOSUB 97;NEXT X
760 X=5;GOSUB 80;X=-5;GOSUB 80;N=2;NT=20;FOR G=1TO 10;FC=RND (256);MU=83;MU=82;
GOSUB 40;NEXT G;NT=0;FC=92;H=1
1000 Z=10;GOSUB 90;FC=7;BC=0;GOSUB 87;CY=-40;CX=-70;PRINT "TRICK...";GOSUB 70;N
=9;GOSUB 40;FC=155;BOX 0,24,151,39,2
1200 CX=27;PRINT "OR TREAT!";LINE -60,6,4;LINE 60,6,1;GOSUB 85;GOSUB 46;LINE 0,
4,4;LINE -7,-10,2;LINE -4,-15,2
1300 BOX -7,-22,5,5,2;FOR N=-44TO -20STEP 4;LINE N,0,4;LINE N-10,-35,1;GOSUB 100
;LINE -N,0,4;LINE 10-N,-35,1;GOSUB 100;NEXT N
1310 FOR N=1TO 11;GOSUB 100;NEXT N;NT=200;MU=56;NT=0;N=20;GOSUB 40;GOTO 10

```



The following instructions apply for ease in tape-loading this

program:

After the program is entered, enter the following:

```
10 TV=0; TV=2
20 PRINT "&(20)=130
30 PRINT "@(0)=60;@(1)=59;@(2)=68;@(3)=67;@(4)=56;@(5)=59;@(6)=63;@(7)=68;@(8)
=64;@(9)=61;@(10)=63;@(11)=59
40 PRINT ":RETURN; RUN
```

Then turn the tape recorder on for recording and press GO. When the program has printed and ":RETURN;:INPUT 2" appears on the screen, turn the tape recorder off but do not rewind the tape.

Then clear the memory (ERASE) and enter the following program:

```
10 :PRINT ;PRINT ".HALLOWE'EN GRAPHICS";PRINT ".BY S. WALTERS 10/11/80";PRIN
T ;LIST ;PRINT ;PRINT ".STANDBY FOR";PRINT ":RETURN ;:INPUT 2
```

Then enter the following: :PRINT; RUN (without GO)

Now turn the tape recorder on for recording and press GO. When all the data has been printed, turn the tape recorder off and rewind it. The tape is now ready to load with :INPUT and run automatically when loaded.

WHERE'S the Add-Under? Well, I understand that the specifications have finally been settled upon - apparently everything up to now has been on a sort of 'what if' or 'would you like' or 'suppose we added' basis. The board layout is underway right now, and the most recent list of "goodies" remains at 16K RAM, 32K ROM, the VOTRAX speech chip, Z-GRASS, of course, and expansion capability to disc. At this point, I think they will have to work hard to get a real prototype ready for the Spring Consumer Electronic Show. I expect I'll be there to see what's what.

ARCADIAN PROGRAMS ON TAPE, mentioned on p. 101, are becoming a reality. As part of the advertising campaign to get more subscribers, we are informing purchasers of the new ARCADE PLUS that they can receive a "Sampler" tape of ARCADIAN programs. This sampler is on the 2000 baud format usable by the new machine, and contains 10 programs of various types (graphics and games). Each of the 10 authors of the programs on the tape receive a royalty on each purchase.

We are also working on a set of taped programs, to fall under the general title of "Best of ARCADIAN, 198x", each of which will contain a selection of the most popular of a particular Volume of the ARCADIAN. We are now busy "translating" the programs to the 2000 baud format, and will make these also available to purchasers of the ARCADE PLUS, as well as to purchasers of the AstroVision Basic cartridge itself. Again, the authors will receive a royalty for their programs.

EXTENDED BASIC, as produced by Perkins Engineering, is called "Blue Ram Basic", and will sell for \$49.95. The purchaser will receive a cartridge that slips into the game slot and can access the Blue Ram memory. We will start to have some programs for this system in one or two issues. The programs themselves should be able to work on the Viper System as well, with possibly some trivial changes - we have to try them out to be more definitive. We strove to maintain compatibility, but there is always one or two little things that need changing. The AstroVision and Bally Basics are similarly compatible - and their programs need minor changes.

# ARCADIAN

```

10 :RETURN ;CLEAR
20 FOR X=-70TO 65STEP 8;BOX X,0,1,72,1;NEXT X;FOR Y=-36TO 36STEP 8;BOX -6,Y,12
8,1,1;NEXT Y
25 A=-66;B=-32
30 BOX A,B,7,7,3
40 BOX A,B,7,7,3;A=A+JX(1)68;IF A>65A=62
50 IF A<-70A=-66
60 B=B+JY(1)68;IF B>36B=32
65 IF TR(1)IF A<60GOTO 200
70 IF B<-36B=-32
80 BOX A,B,7,7,3;IF TR(1)IF KN(1)>0BOX A,B,7,7,1;GOTO 80
90 IF TR(1)IF KN(1)<0BOX A,B,7,7,2;GOTO 30
100 GOTO 40
200 A=128;B=0;C=0;FOR Y=32TO -32STEP -8;FOR X=-66TO -10STEP 8;IF PX(X,Y)B=B+A
210 A=A-2;NEXT X;GOSUB 500;A=128;B=0;FOR X=-2TO 54STEP 8;IF PX(X,Y)B=B+A
220 A=A-2;NEXT X;GOSUB 500;A=128;B=0;NEXT Y;GOTO 1030
500 @(C)=B;C=C+1;RETURN
1020 %(Y)=U;Y=Y+W;RETURN
1030 CLEAR ;NT=1;X=0;Y=2020;R=Y;W=2;Z=1020
1100 V=-43;GOSUB Z;V=6965;GOSUB Z
1110 V=10240;GOSUB Z;V=20210;GOSUB Z
1120 V=-13871;GOSUB Z;V=-1936;GOSUB Z
1130 V=-32690;GOSUB Z;V=12288;GOSUB Z
1140 V=2432;GOSUB Z;V=527;GOSUB Z
1150 V=-247;GOSUB Z;V=78;GOSUB Z
1160 W=1;Y=Y-W;FOR S=0TO CSTEP 2;IF @(S)=128IF @(S-1)=0CY=40;PRINT "DOES NOT COM
PUTE!";L=1
1170 V= @(S);GOSUB Z;V= @(S+1);GOSUB Z;NEXT S
1190 %(20283)=10320;CALLR
1200 IF L=1L=0;GOTO 2000
1210 CY=0;PRINT "OK?";IF KP#13PRINT "COMPUTING!";GOTO 2000
1220 CLEAR ;:PRINT ;NT=0;TV=0;TV=1;FOR X=RTO YSTEP 2
1240 PRINT #1,"%(",X,")=",%(X)
1250 NEXT X;PRINT "":RETURN ;RUN
1260 :RETURN ;STOP
2000 FOR Z=1TO 144;@(Z)=0;NEXT Z;A=0;FOR Y=-5TO 3;FOR X=0TO 15;A=A+1;IF PX(X,Y)@
(A)=1
2010 NEXT X;NEXT Y;A=0;CLEAR ;FOR Y=-32TO 32STEP 8;FOR X=-66TO 54STEP 8;A=A+1;IF
@ (A)BOX X,Y,7,7,1
2020 NEXT X;NEXT Y;GOTO 20

```

Bob Weber  
6594 Swartout Rd  
Algonac, MI 48001

Load the program and RUN it. The program will draw a 9 x 16 grid on the screen, and there will be a flashing cursor in the bottom left hand corner. Move the cursor with the joystick, and when you have it located, turn the knob to the right and press the trigger. This will blacken in a square. If you want to 'erase', turn the knob to the left and press the trigger. When you are satisfied with the character, move the cursor to the right side of the screen and press the trigger. The machine will now compute the values and load them into a string. When it is finished, it will display the character in actual size on the screen and ask 'OK?'. If everything is the way you want it, prepare the tape you are going to use, and press GO. If it is not the way you want it, press any key other than GO, and you will be back in the character construction mode.

If the computer says 'DOES NOT COMPUTE', it means you have a single pixel placed in the left hand corner of either the left or right half of the drawing. When you do this you cannot load the values onto tape, because the poked value for one pixel at those locations is 32768, too big for the computer.



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SIG BALLY in Chicago is reforming after a long summer vacation. For more information call Hank Chiuppi 312-537-6079. New members welcome.

---

ENTREPRENEURS may be interested in a new Newsletter devoted to the kitchen-table programmer, etc., who wants to use a microcomputer in business, or make a business out of his computer. Entitled MICRO MOONLIGHTER NEWSLETTER, it is supposed to talk about methods of operation, tax shelters, mail order, advertising, etc., all geared to the small operator. Inquire of J.Norman Goode, 2115 Bernard Ave., Nashville, TN. 37312..

DUNGEONS AND DRAGONS Game Aid Package - now with more programs, including player character generator. \$10. ppd Rich Tietjens PSC Box 542, APO miami, FL 34004

I've had a number of telephone calls from people looking for Fred Cornett. The best available data I have locates him at 711 Pineknott, Big Bear Lake, CA 92315 714-866-5826

Southern California dealer - Randy's TV P.O.Box 1109 El Centro CA 92244 has many old Bally videocades on sale, with a good deal of BASIC. Also in stock - Galactic Invasion, Space Invaders, Grand Prix

---

SUBSCRIPTION 12.50

130

## ARCADIAN

Robert Fabris, renewable  
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